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Original Articles

Scarlet Fever

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The intelligent prevention and treatment of a disease must depend on a definite knowledge of its cause. Attempts to learn the etiology of scarlet fever have long been hampered by failure to obtain the disease experimentally. Symptoms that might represent scarlet fever in animals had been described by various authors; but these symptoms were indefinite and inconstant, and had followed inoculation with different materials and cultures. No organism had produced in animals a condition that could be accepted as experimental scarlet fever.

After three or four years of work on the bacteriology of the throat, blood, urine, and organs of scarlet-fever patients, we had been able to verify the results of previous investigators in regard to certain facts: First, that hemolytic streptococci are practically constantly associated with scarlet fever. Second, that, while a variety of bacteria may be found in blood cultures, no one organism is present constantly in the blood stream during the acute stage of the disease.

We attempted to produce experimental scarlet fever in guinea-pigs, mice, rabbits, dogs, pigeons, and small white pigs. Monkeys were not used, because they had been so thoroughly tried by previous investigators that it seemed unnecessary to repeat their work. The animals were inoculated with blood from early cases, and with pure cultures of many different bacteria obtained from scarlet fever; also with ground-up organs from post-mortems, and with mucus freshly obtained from the throat early in the disease.

In this long series of animal inoculations an occasional rash was obtained, and less frequently, desquamation. But no one organism produced these symptoms constantly in any species. So that the most essential evidence for the determination of the etiology of scarlet fever was still lacking.

We decided that animals are comparatively insusceptible to the disease, and that it would be necessary to use human volunteers for the production of experimental scarlet fever.

The successful inoculation of smallpox as a preventive measure had led to the hope of a like success from inoculation of scarlet fever, and numerous attempts had been made to reproduce the disease experimentally in man. Erasmus Darwin, the grandfather of Charles Darwin, had urged the medical profession to undertake such inoculations in the hope of discovering a method of preventing scarlet fever. He had suggested that matter might be taken from the ulcers in the throat, or that some of the skin might be scraped off and inoculated.

Attempts had been made to produce experimental scarlet fever in man by inoculation with material from erythematous areas; serum from miliary vesicles; skin scales and blood from scarlet-fever patients. Up to January, 1923, there was on record

no case of undoubted experimental scarlet fever. The accidental inoculations of human beings had occurred under conditions that threw no light on the etiology of the disease.

Even with human volunteers, we did not expect to obtain experimental scarlet fever readily; for it was known that less than half of the persons exposed to scarlet fever contract the disease.

Healthy young adults who said that they had not had scarlet fever were chosen. In the first series of human inoculations, reported in 1921, volunteers were inoculated with fresh whole blood and fresh blood serum from acute cases of scarlet fever; also with filtered throat mucus from early cases. The results of these inoculations were negative. Then, since the hemolytic streptococcus is the organism most constantly associated with scarlet fever, and the one to which immune bodies are most constantly produced, the next volunteers were inoculated with pure cultures of hemolytic streptococci isolated from scarlet fever. In this series we obtained an occasional sore throat and fever, but no rash. We thought that failure to obtain the rash might be due to a relative insusceptibility on the part of the volunteers, and decided to do some further inoculation experiments, using volunteers of an intelligent type, who could give their full personal and family history, and to choose them, so far as possible, from those who had never been exposed to scarlet fever.

In this series, reported in 1923, we obtained a case of typical scarlet fever by inoculation with a pure culture of a hemolytic streptoccocus. This streptococcus had been isolated from a lesion on the finger of a nurse who acquired the disease while caring for a convalescent scarlet-fever patient.

This was the first case of typical scarlet fever produced experimentally with a pure culture of any organism.

It was still necessary to learn whether the experimental scarlet fever had been produced by the hemolytic streptococcus or by a filterable virus associated with it in the culture. A second group of volunteers were inoculated with a culture of the same organism after it had been passed through a Berkefeld "v" filter. These volunteers remained well. After two weeks had elapsed, and they were still well, they were inoculated with the unfiltered culture. Forty-eight hours later one of them developed scarlet fever. This experiment furnished evidence that the experimental disease was not caused by a filterable virus but was due to the hemolytic streptococcus itself.

There were still some difficulties. First, not all of the hemolytic streptococci associated with scarlet fever are of the same cultural type. Some ferment mannite, while others do not ferment mannite. And it was necessary to show that each type is capable of producing the disease. This was done by inoculating other volunteers with the second cultural type, and obtaining another case of experimental scarlet fever.

The requirements of Koch's laws had now been fully met, and we were justified in concluding that scarlet fever is caused by the hemolytic streptococcus.

Since the hemolytic streptococcus is found in the throat, and is only seldom present in the blood, it is evident that the rash of scarlet fever is not produced by the direct action of the streptococcus on the skin. It was still important to learn by what means the streptococcus, growing in the throat, causes the rash.

We found that the scarlet fever streptococci produce a toxin. When this toxin is absorbed into the blood it produces the rash.

The toxin is obtained by inoculating plain broth with the strains of streptococci that produced experimental scarlet fever in human beings. A small amount of blood is usually added to the broth at the time of inoculation. After incubation the broth cultures are passed through porcelain filters to remove the bacteria. The filtrate is cultured for sterility, and kept in a refrigerator.

When suitable amounts of toxin are injected in susceptible persons, it may cause a reaction characterized by general malaise, nausea, vomiting, fever, and a generalized

scarlatinal rash. In other words, the sterile toxin, alone, is capable of producing the characteristic symptoms of scarlet fever, including the rash.

These symptoms appear within a few hours after injection of the toxin, and disappear within forty-eight hours.

The toxin is resistant to heat at temperatures ordinarily employed to kill bacteria, but is destroyed by still higher temperatures.

It is neutralized by convalescent scarlet-fever serum due to the presence of an antitoxin in the blood of recovered patients. If persons susceptible to scarlet fever are immunized by injections of small doses of toxin, their blood serum acquires similar antitoxic properties.

These facts indicate that we are dealing with a true soluble toxin, specific for scarlet fever.

While minute quantities of the toxin will produce symptoms of scarlet fever in susceptible adults, laboratory animals are comparatively insusceptible to it, so that it is necessary to standardize the toxin on human beings.

The discovery of this toxin offered a scientific basis for:

First, the recognition of scarlet-fever streptococci.

Second, the development of a skin test for susceptibility to scarlet fever.

Third, preventive immunization.

Fourth, the production of an antitoxin.

The two strains of streptococci that caused experimental scarlet fever in man differed culturally, and were not agglutinated by the same immune serum, but they had in common the property of producing the specific toxin of scarlet fever.

Up to the present time there has been no satisfactory way of identifying scarlet-fever streptococci. Since the recognition of the specificity of the agglutination test, and its application to the diagnosis of typhoid fever, many observations have been made on the agglutination of streptococci in relation to scarlet fever. The results of early investigators indicated that most, but not all, of the streptococci associated with scarlet fever are agglutinated by the same immune serum.

But the agglutination test has not furnished a reliable means of identifying scarlet-fever streptococci. Certain strains cannot be tested because of spontaneous agglutination. No serum agglutinates specifically streptococci from all cases of scarlet fever. And agglutination of streptococci from other sources is not uncommon.

A study of the toxin production of hemolytic streptococci offers a more hopeful means of identifying those organisms that are capable of causing scarlet fever.

For some years there has been discussion as to whether scarlet-fever patients with discharging suppurative lesions should be quarantined until all discharges are stopped, or whether these lesions should be regarded as due to secondary invaders, and the patient released at the end of the usual period of quarantine.

Since hemolytic streptococci are present in the discharges, and as scarlet fever is now known to be caused by hemolytic streptococci, the question narrows to a determination as to whether or not the streptococci present in the suppurative lesions are the primary organisms or some different and non-specific type of hemolytic streptococcus. This may be decided by testing them for specific toxin production.

In testing these cultures for toxin, it is important to begin with high dilutions of the filtrate. For it has been found that various strains differ considerably in the strength of toxin that they produce, and this precaution avoids unnecessarily strong reactions.

Dilute solutions of scarlet fever toxin are employed in skin tests to determine susceptibility to the disease. The toxin is first carefully standardized on human beings, and diluted so that 0.1 cc represents a skin test dose.

An exact dose of 0.1 cc of the skin-test solution is injected intradermally on the flexor surface of the forearm at the junction of the upper and middle thirds. The reaction is observed in a bright light, not earlier than twenty-two hours and not later than twenty-four hours after the test is made.

An area of reddening 1 cm. or more in diameter constitutes some degree of a positive reaction. An area of reddening less than 1 cm. in diameter is a negative test.

A reaction that has appeared but is entirely faded at the end of twenty-four hours is negative.

We use a ½-cc Record syringe graduated in tenths of a cubic centimeter, with a luer tip and a half-inch, 26-gauge Summit needle. The arm is cleaned with alcohol and then dried. The outside of the syringe is wiped dry. After the test is made the arm and outside of the syringe are inspected for any drops of fluid to make sure that there has been no leakage about the syringe or needle. The commonest point of leakage is at the junction of the needle with the syringe. This occurs less frequently with the needles that have a soft britannia metal top than with those made of hard metal.

The syringes are sterilized by boiling twenty minutes, and the needles are sterilized by boiling or by dry heat.

Any antiseptic solutions used for the syringes or needles may cause slight skin reactions.

The long boiling is necessary to destroy any traces of toxin left in the syringes or needles from previous use.

No syringe or needle is ever used for a control test solution after it has been used for the toxin until it has been thoroughly cleaned and boiled twenty minutes.

After use the syringes and needles are washed with water, alcohol, and ether, and kept dry.

With this technique we have not found control tests necessary except after active immunization with the toxin, when a true pseudo-reaction is occasionally found. The best control solution is the sterile medium, filtered and used in the same dilution that has been found correct for the corresponding batch of toxin.

Pseudo-reactions were described by Zingher, who noted that they are more likely to occur after immunization. They are frequent enough to make the use of a control test after immunization advisable.

In our first series of skin tests reported in January, 1924, we found positive or strongly positive reactions in 41.6 per cent of the persons who gave no history of scarlet fever, and negative or only slightly positive reactions in all of the convalescent scarlet-fever patients tested.

Branch and Edwards reported 40 per cent positive or strongly positive reactions in persons with no history of scarlet fever, and negative reactions in all of the convalescent scarlet-fever patients tested.

Zingher found a similar relation between immunity to scarlet fever and skin tests with scarlet-fever toxin.

Zingher showed that there is a parallelism between immunity to scarlet fever and immunity to diphtheria in various age and social groups. He demonstrated a placental transmission of scarlet-fever antitoxin from mother to child. According to his results, most infants show negative reactions during the first months of life, and the skin test becomes positive toward the end of the first year. In this connection it is interesting to note that, nearly one hundred years ago, Most, in speaking of the possibility of inoculating against scarlet fever, recommended that such inoculations should not be attempted in children under two years of age because of the insusceptibility of the young child.

Since Jenner's success with smallpox vaccination, many attempts have been made to inoculate human beings with scarlet fever in the hope of preventing more severe attacks.

The most extensive use of vaccine for the prevention of scarlet fever was made in Russia. This procedure was introduced by Gabritschewsky in 1905. The vaccine was prepared from broth cultures of hemolytic streptococci isolated from scarlet fever. These cultures were heated at 60° and preserved with 0.5-per-cent carbolic acid. Three subcutaneous injections of the vaccine were given. Altogether this method was employed in about fifty thousand cases. Mild attacks of scarlet fever, with rashes, either local or general, were described following administration of the vaccine.

In the light of our present knowledge of

scarlet-fever toxin, it seems probable that this toxin was present in the broth cultures used in the preparation of Gabritschewsky's vaccine. So that while they believed their results to be due to a streptococcus vaccine, the rashes described, and any immunity obtained, may have been due to toxin unwittingly injected along with the killed streptococci.

After demonstration of the specific toxin of scarlet fever and the development of the skin test for susceptibility, we began immunization of susceptible persons by subcutaneous injections of small doses of toxin. We found that by beginning with a small dose it is possible to avoid severe reactions.

In any large series of skin tests there will be found a group of clearly negative reactions; another group of definitely positive reactions; and a third group of slightly positive tests.

Persons who show negative skin tests do not require immunization. We are immunizing all those who show any degree of a positive reaction.

The immunization consists of three doses of toxin given at five-day intervals.

Following immunization, a skin test should be made to determine the degree of immunity that has been obtained.

A type of skin reaction frequently found after immunization is one that appears quickly, but fades within twenty-four hours, and is, therefore, negative.

If the skin test is still positive after three immunizing doses, the third dose should be repeated, or a larger dose may be given.

Experience has shown that immunization must be carried to the point of a negative skin test.

Prevention of scarlet fever, after exposure, is more complicated. In case of a definite exposure, skin tests are made as soon as possible, and at the same time a culture of the throat is made on blood agar plates.

If the skin test is negative, nothing more is done.

In those with positive skin tests, the next step depends on the throat culture. If the plates show no hemolytic streptococci, and further exposure can be avoided, active immunization is carried out with three doses of toxin.

If the throat culture shows hemolytic streptococci, passive immunization is accomplished by injection of convalescent scarlet-fever serum, or concentrated scarlet-fever antitoxin. We use convalescent serum, when it is available, to avoid sensitization to horse serum.

The passive immunity is transient. It does not protect for more than a few weeks.

These preventive measures were carried out in a series of 200 persons exposed to scarlet fever. One hundred of this series were nurses in contagious disease hospitals who were tested and immunized before exposure.

One hundred were children who were not seen until after exposure. Ten of the children with positive skin tests showed hemolytic streptococci in their throat cultures; they received convalescent serum. Five already had sore throat and fever at the time they received the serum.

None of these 200 persons exposed to scarlet fever developed the disease.

Controls were offered by forty-two nurses and interns on whom skin tests were not made, and by two nurses who were exposed to scarlet fever before their immunization was completed. These two nurses and seven others of this control series contracted scarlet fever.

The toxic element of scarlet fever has long been recognized by clinicians. Variation in degree of toxemia has served as a basis for the differentiation of clinical types. Thus Osler, in describing the fulminant toxic type, wrote: "With all the characteristics of an acute intoxication, the patient is overwhelmed by the intensity of the poison, and may die within twenty-four or thirty-six hours."

And Holt said of the malignant type: "Death occurs apparently from scarlatinal toxemia."

When the use of convalescent serum in the treatment of scarlet fever became gen-

eral, it was learned that it is the severe, toxic type of scarlet fever in which it is the most useful; and that the symptoms most benefited are those commonly attributed to the toxemia.

In 1895, Marmorek obtained an antistreptococcic serum by immunizing horses with living streptococci. This serum was not produced with a view to its use in scarlet fever alone, but with the idea that it would be useful in all streptococcus infections.

Since then many antistreptococcic serums have been prepared for use in scarlet fever. Of these serums, the one most widely used was that described by Moser in 1902. Moser immunized horses with living cultures of hemolytic streptococci cultivated from the heart's blood of fatal cases of scarlet fever. He reported a series of cases treated with his serum, and two control series: one treated with Marmorek's serum and one with normal horse serum. There can be little doubt that Moser's serum exerted a favorable influence on the rash, temperature, and general condition in many cases of scarlet fever.

The antistreptococcic serum described by Dochez and Sherman in 1924 was also obtained by immunizing horses with living streptococci isolated from scarlet fever. The method of immunization differed in detail from that employed by Moser in that while Moser injected serum broth cultures of the streptococci, Dochez and Sherman injected agar cultures.

It has been necessary to employ all of these antistreptococcic serums in large doses —up to 100 and even 200 cc. This results in frequent and severe serum reactions. It was on account of these serum reactions, to which some deaths had been attributed, that the use of Moser's serum was gradually abandoned.

If horses are immunized by subcutaneous injections of gradually increasing doses of sterile scarlet-fever toxin, they produce an antitoxin capable of neutralizing the toxin.

This serum may be concentrated by the same method employed for the concentration of other antitoxic serums.

The resulting product is of high antitoxin content, and the serum reactions that it causes are so few and mild that they do not interfere with its routine use in the treatment of scarlet fever, or with its prophylactic use when convalescent scarlet-fever serum is not available.

Scarlet fever throughout the country has been comparatively mild for several years. The present low death-rate from this disease shows that not many lives will be actually saved by any serum.

In 430 cases of scarlet fever admitted to the Durand Hospital in one and a half years there were only five deaths. All of these fatal cases were admitted comparatively late in the disease and were septic. Three had bronchopneumonia, empyema, and nephritis; one had suppurating cervical lymph glands and nephritis. The other was a case of puerperal sepsis, with sloughed perineal stitches, foul lochia, and persistent vomiting. It is not probable that any serum could have saved the lives of these patients after the complications had developed.

Blake, Trask, and Lynch reported results with the antistreptococcic serum prepared by Dochez and Sherman in a series of 13 cases of scarlet fever occurring in New Haven last winter. In their series of 13 cases, the one death results in a mortality of 7.6 per cent. If the two cases which these authors describe as having an almost hopeless prognosis without the serum had died, there would have been a mortality of 23 per cent in their series.

This would indicate an exceptionally virulent type of scarlet fever in New Haven, while scarlet fever in the rest of the country was comparatively mild. On investigation, we found nothing to indicate that this was the case.

They offered no control series, but from the records of the New Haven health department we learned that out of 197 cases of scarlet fever reported in that city between the first of January and the first of April, 1924, there were only two deaths, resulting in a mortality of but 1 per cent. And one of these deaths occurred in Blake's series of 13 cases.

These figures illustrate the necessity for a

large series of cases and adequate controls in attempting to determine the therapeutic value of any serum.

We have been employing the concentrated scarlet-fever antitoxin in some of the more severe cases of scarlet fever admitted to the Durand Hospital. Our series is not yet large enough to justify definite conclusions as to its value.

We have found that if the antitoxin is given early in the disease, there is a definite fading of the rash apparent within twenty-four hours, and that there is an improvement in the toxic symptoms; so that the antitoxin may be said to remove the toxic element of the disease, including the rash. The subsequent course depends on the local infection in the nose and throat.

The sinuses, glands and ears are frequently involved early in the disease. After enough antitoxin has been given to relieve the patient of the necessity for combating the toxemia, these local complications should receive careful attention.

Because complications may occur so early in scarlet fever, and the damage done by the disease is to be estimated not so much in the number of deaths as in the after-effects, the importance of preventive immunization is apparent.

Mercurochrome-220 Solution in the Treatment of Erysipelas

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Assuming that erysipelas is a streptococcic infection and mercurochrome has been used successfully in the treatment of streptococcic infection,[1] the authors felt that the use of this drug in the treatment of erysipelas was indicated. During the past winter and spring at the Danville State Hospital there appeared a rather unusual number of cases in the female department, and the opportunity presented itself for such a treatment, bedside notations, and laboratory findings.

When the disease first made its appearance, the usual precautions of placing patients in a single room, with especial attention given to care of hands, linen, dishes, etc., was taken. Such a procedure was not effective, and strict quarantine in isolation quarters was resorted to. Just how effective this procedure was is purely speculative, other than we knew it prevented spreading by contact. Having once appeared in a given ward, cases would develop long after the period of incubation or exposure. A striking coincidence was that on wet, damp or cloudy days new cases were prone to develop in a once infected ward. The infection ran its course, subsiding in July after running its peak course without a break in January, February, March, April, May, and June. The treatment instituted was systemic, local application of ichthyol colloidin, application of iodine to marginal areas with magnesium sulphate dressing. All of these were eventually discarded save systemic treatment and the use of mercurochrome. The treatment consisted of intravenous injections of 1-per-cent solution mercurochrome soluble in freshly distilled water, the doses ranging from 20 to 40 cc, dependent on the approximate kilo weight of the patient. One dose was given, followed in twenty-four hours by a second dose, as will be observed in the case reports. The diagnosis in these cases was confirmed by Dr. G. B. M. Free, assistant superintendent, and the treatment and observation made by Dr. C. L. Johnston.

[1] Young and Hill: *Journal A.M.A.*, March, 1924, lxxxii, 669.

Case 1.—H. S. Recurrent of the leg. Onset March 27. Temperature 101° at 1 P.M. Given 20 cc mercurochrome. Temperature rose steadily, and at 4 P.M. was 103.2°; then fell on March 29 at 4 P.M. to 99°. The processes stopped spreading. At 9:45, the temperature having reached 101°, she was given a second dose of 20 cc mercurochrome. Temperature rose to 104° at 4 P.M. and then fell to 99°. It never again rose above 99°. Process cleared. Patient discharged from isolation April 7, temperature having been normal since March 31, 1924. Diarrhea moderate.

Case 2.—C. B. Patient had extensive facial erysipelas with blebs and vesicles, extensive swelling over face; both eyes closed. Temperature 101°. Was given 20 cc mercurochrome 1:30 P.M. At 3:30 P.M. temperature 102.6°, rose to 103.8°, and at 7 A.M., March 28, was 100.2°. Diarrhea very profuse and was incontinent. Temperature rose again on March 28, and patient was again given 20 cc mercurochrome. Temperature rose to 104.2° and then fell to 98°. The blebs and vesicles dried after the first injection, and the lesion did not tend to spread further.

On June 16, patient had a recurrence of erysipelas of the ear again with blebs and vesicles. Temperature 100°. Patient was given 20 cc mercurochrome at 9:30 A.M. At 12 noon, temperature was 104.4°. At 4 P.M. temperature was 101°, and at 12 midnight was normal. Patient had little or no diarrhea. Lesions promptly cleared and she made an uneventful recovery.

Case 3.—T. F. Recurrent second attack, March 29. Was given 20 cc mercurochrome at 2 P.M. Temperature 99.3°. Temperature at 4 P.M., 104°; midnight, 99°. On the 30th there was a slight rise to 100° at 4 A.M., which promptly subsided, temperature going to normal, patient making an uneventful recovery.

Recurrent third attack. Patient had erysipelas of the arm and face. Temperature on admission to isolation, 100°. Given 20 cc mercurochrome at 7 P.M. At 8 P.M. temperature was 103°, at midnight 102.8°. At 4 A.M. on the 8th the temperature was again 100°, and at 8 A.M. was 98.3°. Temperature did not rise after this and patient again made an uneventful recovery, being up and about on the third day. This patient had no diarrhea or untoward symptoms.

Case 4.—T. W. Erysipelas, facial. Temperature 103° at 12 noon. Was given 25 cc mercurochrome. Temperature at 8 P.M. 106°; on following day at noon had fallen to 100.8°. On next day, April 5, 1924, at 9 A.M., she was given second dose, 25 cc. Temperature 103° at time of administration of drug, rose to 104.2° at 4 P.M., then fell to 99.8° at 4 A.M., April 6. Temperature continued irregular, varying between 100° and 103° for three days, then fell to 97.4°, remaining there for three days. Heart was partially blocked, and the rate varied from 48 to 60 per minute. On the fourth day the temperature rose to normal, but the condition of partial heart-block persisted for several weeks. After the first dose the lesion faded somewhat and the swelling was less. A small amount of mercurochrome solution escaped into the subcutaneous tissues. No especial reaction was noted at the time, but two days later the patient complained of numbness and pain in the arm and forearm. (This patient has a chronic heart lesion, mitral regurgitation.)

Case 5.—U. K. Facial. Admitted isolation April 4, 1924. Temperature 100°. Was given 25 cc mercurochrome at 2:15. Temperature rose to 104.4° at 4 P.M. On the 5th at 1 P.M. temperature was normal; the 6th it went up, and for the three days following varied between 100° and 103°, coming to normal the 10th of April. Convalescence was uneventful. This patient had very profuse diarrhea. No other untoward symptoms.

Case 6.—G. J. Patient was very resistive and demented, and it was impossible to take her temperature. She was given 25 cc mercurochrome at 8 A.M., and the first temperature was taken at 4 P.M. of that day, April 16, 1924; was 106° at 8 P.M. April 17 the temperature was 99°, and continued irregular between 99° and

102° for the next two days. On April 19 she was given a second dose of mercurochrome 25 cc. The temperature did not rise, but fell slightly from 101.6° to 100°. On the 21st the temperature came down to normal, and continued normal and subnormal to the 26th, when the patient died at 7 A.M. All signs of the erysipelas had cleared. She had a very severe stomatitis. After the second dose the patient vomited in about one-half hour and there was mercurochrome in the vomitus. The diarrhea was very severe. This patient was extremely restless and simply wore herself out in her weakened condition. She was incontinent, and it was impossible to obtain a specimen of urine. Autopsy was refused.

Case 7.—L. M. Facial. Admitted isolation April 22, 1924. Temperature 102°. Was given 30 cc mercurochrome at 1 P.M. Temperature rose to 104.4° at 4 P.M., and at 8 A.M. the next day was 99.4°. The temperature gradually rose again to 103°, and on April 25, 1924, she was given a second dose of 25 cc mercurochrome at 6:45 P.M. Temperature rose to 104° at 8 P.M., then fell on the following day to 99.2°, and on the 27th was normal. Convalescence was uneventful. The patient had a moderate diarrhea. No untoward symptoms. Swelling and redness subsided after the first dose of mercurochrome.

Case 8.—S. A. Erysipelas of leg. Was given 22 cc mercurochrome at 10 A.M., temperature being 101.6°. Temperature rose to 104.4° at 8 P.M., and at noon the following day was 100°. It then rose to 104° the following day and remained high. Diarrhea was very severe and continued for several days. Patient had severe hemorrhage from the bowels and albuminuria; also had severe stomatitis. No effect on local lesion nor on the systemic condition.

Case 9.—E. M. Recurrent of the face. Temperature 103.4° on admission to isolation April 14, 1924. Was given 35 cc mercurochrome. Temperature rose to 105° six hours later, then fell the following day to 101.6°, after which it gradually rose to 103° before death. Patient died 8 P.M., April 15, 1924. Autopsy findings revealed cause of death as erysipelas. Contributory—chronic degenerative myocarditis. Associated—acute glomerular nephritis; atrophy of the spleen; passive congestion of the liver and passive congestion of the lungs.

Case 10.—E. F. Admitted isolation May 3, 1924, with extensive facial erysipelas. Temperature normal; 20 cc mercurochrome at 9:30 A.M. Temperature at 4 P.M. same day, 102°, fell to 98.8° at noon next day,

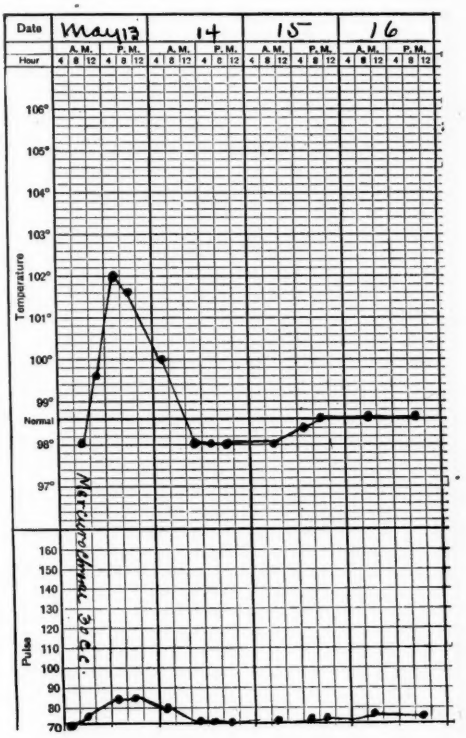

Chart I (Recurrent). Case No. 7.

and went up to 100.8°. No effect on lesion, which continued to spread. May 5 at 4:45 P.M. temperature rose to 101.8°, then promptly fell to 98.4°, and at 8 A.M. on the 6th the third dose was given, twenty-four hours after second, as lesion had continued to spread. Temperature this time went to 100.9°, and on the 8th fell to 98° at 12 noon, then rose to 100.8°. Patient died 8:30 P.M., May 6, 1924. This patient had no diarrhea. The drug had no effect on the lesion or on the systemic condition.

Autopsy findings revealed cause of death as erysipelas. Contributory—pulmonary congestion and edema. Associated—facial abrasions, erysipelas; chronic fibrous pleuritis; brown atrophy of the heart; senile arteriosclerosis; passive congestion of the liver; atrophy of the spleen; chronic degenerative nephritis. The spleen was very small and showed no reaction whatever.

Diarrhea was profuse for a few days following administration of drug. Convalescence uneventful.

Case 12.—E. T. Facial. Admitted to isolation May 9, 1924. Temperature at the time of admission was 104°. Was given 30 cc mercurochrome at 5:45 P.M. At 7, temperature had fallen to 101°, at 9 P.M. had risen slightly to 102.3°, and at 4 A.M.

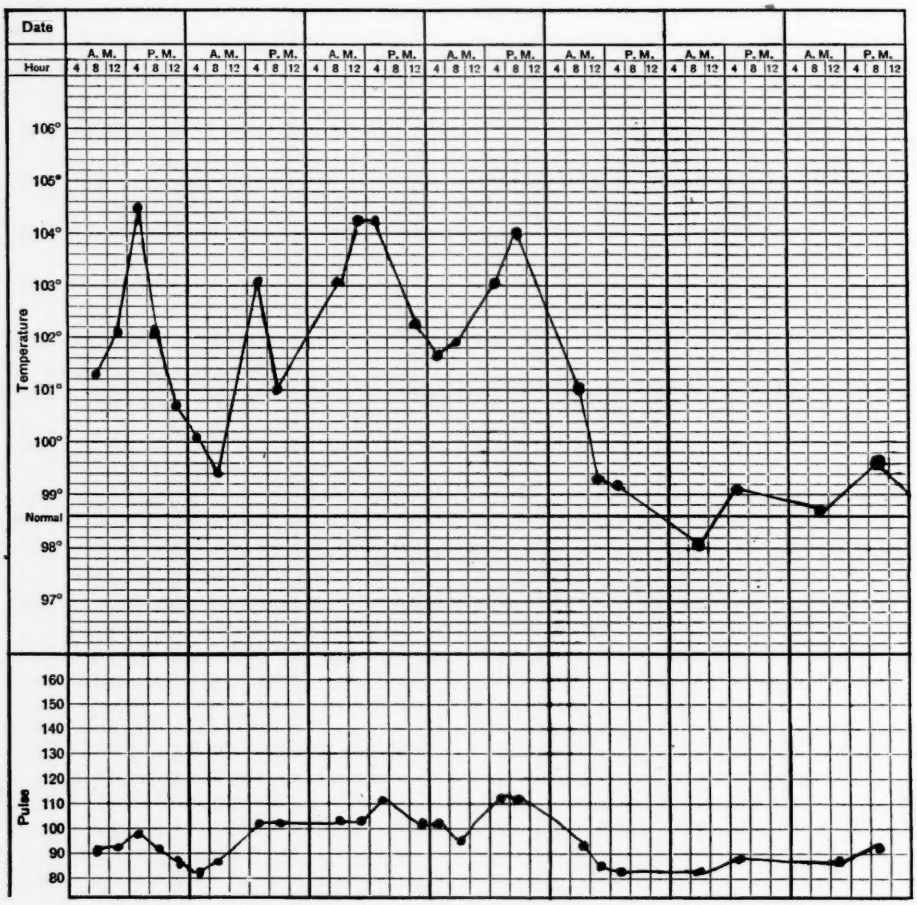

Chart II (First attack). Case No. 13.

Case 11.—E. D. Facial. Temperature on admission, 101°. Was given 25 cc mercurochrome at 8:30 A.M. Temperature rose to 103.6° at 4 P.M. and then fell to 100.4° the following day. Swelling and brawny induration became better. Temperature rose on the next day to 103° and promptly fell to 100°. Was irregular for one day, then fell to normal on the fifth day after onset.

was 100°. Thus she had no initial rise. On the 10th her temperature had again risen to 104.3°, where it staid with slight fluctuation until the 12th, when at 10 A.M. her second dose of 30 cc was given, as the first dose had caused no appreciable change in the symptoms. Her temperature rose from 104.3° at 10 A.M. to 105° at 4 P.M. At 8 P.M. it had fallen to 103.3°, and at

4 A.M., the 13th, to 99.4°. Temperature continued very irregular until the 20th, when she had seven teeth extracted. Following the second dose this patient had a very severe stomatitis with ulceration of the gums, which accounted for the continued temperature. Following the second dose the local lesions faded and the patient's general condition improved considerably. Following both the first and second dose, this patient had several epileptic seizures, and it was necessary to give her luminal and allanol to quiet her. Diarrhea was not very severe, but continued for twelve hours after each dose.

Case 13.—A. P. Third recurrence, facial. Temperature at time of injection, 98°; it rose in eight hours to 103°. The following morning the temperature was again 98°. The lesion had faded and convalescence was established. Patient had a rather severe chill following the injection of mercurochrome. Diarrhea was moderate.

Case 14.—M. MacI. Temperature at time of injection of 20 cc mercurochrome, 103.6°. In eight hours the temperature had risen to 104°. Following the injection the patient was more comfortable and swelling was less, allowing the patient to open her eyes. The temperature, however, continued irregular between 102° and 99° for three days, then came to normal. Diarrhea was moderate following the date of injection. Convalescence was uneventful.

Case 15.—C. B. Was admitted to isolation June 15, 1924. Temperature at time of injection was 100°. Was given 20 cc mercurochrome. In one hour the temperature had risen to 101.8°. At four hours the temperature had begun to fall, and at 8 A.M. next morning was again 100°. The following day there was a slight secondary rise, and for the following three days temperature varied between 99° and 99.8°. The effect on the lesion was rather striking. There was no spread after the injection, and on the following morning the lesion had almost disappeared. There was no diarrhea, and the patient was up and about on the fourth day.

Case 16.—E. H. Patient had an infection around the ankle, which partook of the nature of an erysipelatous condition, but it is doubtful whether it was true erysipelas. After she had been under treatment for some time it was decided to try mercurochrome. The patient was given 20 cc. The temperature rose from 102.4° at the time of injection to 105.8° three hours later. It then fell promptly to 99.4° the following morning. The lesion healed rapidly and there was no recurrence. The patient had a moderate stomatitis. Diarrhea was moderate following the injection.

Case 17.—M. T. Leg, recurrent. Patient had rather a mild attack of erysipelas, and just as she was beginning to convalesce had a severe recurrence which spread rapidly over the whole of the leg, with a patch on the other thigh. 20 cc mercurochrome was given. Temperature at time of injection, 100°; in three and one-half hours it was 104.6°, and four hours later had fallen to 101°. The following day it fell to 99.4°, and succeeding five days stayed between 99° and 100°. Convalescence was established and was uneventful. Diarrhea was very severe for two days following injection.

OBSERVATIONS.

The most striking observations were noted in temperature curve, the effect on lesion, recurrent cases, untoward symptoms, diarrhea, stomatitis, convulsions, general effect on course of disease and pathological findings.

The temperature curve has been in this series of cases rather characteristic. There is in most cases a sharp rise and just as sharp a decline after injection. In two cases we have observed a persisting subnormal temperature. In all primary cases there has been a secondary rise but rarely as high as the initial rise (see Chart I). In the recurrent cases the temperature has in every case fallen after the initial rise to

normal, and there has been no secondary rise (see Chart II).

The effect on the lesion was noted. In the majority of cases the swelling has been less and spread of the lesion has been checked. In some of the cases this checking was noted more promptly than in others. In the recurrent cases the spread was promptly checked and convalescence established.

The untoward symptoms were diarrhea and stomatitis. In all of the cases except two diarrhea occurred. In one case there appeared an alarming diarrhea complicated with hemorrhage from bowel, four days after injection of mercurochrome. In the incontinent cases the nurses reported the diarrhea profuse and continuous. Stomatitis was noted in three cases: one was very severe, resulting in ulceration of gums and extraction of teeth. In two cases of epilepsy (SA & ET) one patient had very severe convulsions for several days after the injection. One patient complained for several weeks (TW) of weakness and pain in the arm following the escape of a few drops of solution into the subcutaneous tissue.

The microscopical studies are by Dr. R. A. Kielty, pathologist of the Danville State Hospital. The results on the kidneys in both cases on which autopsies were performed were as follows:

Case 9.—E. M. Section: The sections present a moderate amount of old fibrosis in the capsule, the glomerulo-capsule, the number of cells in the tufts and the capillary walls. The striking feature is the swelling of the epithelial cells with marked granularity, so that the lumens are almost closed. There is a deposition of amorphous black pigment scattered throughout the section, but mostly in the epithelial cell protoplasm, which is probably depositions of mercurochrome.

The glomerular spaces are filled in places with fibrin. Chronic glomerulo-sclerotic nephritis; acute glomerulo-exudative nephritis; acute degenerative nephritis; mercurochrome pigmentary infiltration.

Case 10.—E. F. Section: The section presents a moderate amount of fibrosis involving the capsule with some extension into the cortex, a moderate amount of glomerulo-capsule thickness, and some increase in the number of cells in the glomerular tuft. Many of the small capillaries have thickened walls. The striking feature is the swelling of the cortical epithelial cells which almost obliterate the tubular lumens. In addition, the nuclei are obscured and pale. There is a deposition throughout the section of a black amorphous pigment which is scattered mostly in the cellular protoplasm. In the glomerular space there is a fine exudate. Chronic glomerulo-proliferative nephritis; acute glomerulo-exudative nephritis; acute degeneration; mercurochrome pigmentary infiltration.

It will be noted under microscopical studies that the drug had an unfavorable effect on the kidneys in both cases.

The general effect on the course of the disease was noted. In a few of our cases there was no apparent benefit; the disease was not shortened over the expectation from former methods of treatment. In several of the cases brilliant results were noted, especially in the cases of the worst type showing blebs and blisters. The spread of the lesion was checked, the temperature declined and remained down. In the recurrent cases satisfactory results were noted. The lesion faded in one or two days, convalescence being established within ten or twelve hours after administration of the drug. This we attribute to drug plus the antibodies from previous attack.

CONCLUSIONS.

While mercurochrome has not proven of as much value as we had hoped in this type of case, nevertheless the treatment has proven as effective as any other at our command, and in a few cases the results have been brilliant.

We feel, however, that there are certain untoward actions of the drug that make it undesirable for routine administration, namely, the sharp reaction; the stomatitis; the effect on the kidney. In one case we

had a transitory albuminuria, and in one case an acute glomerular nephritis, following its use. We believe, therefore, that a kidney functional test should be done before the drug is administered. The diarrhea, where long continued and very profuse, serves to weaken the patient and thus throw the balance against him.

In selected cases, able-bodied patients who have no kidney involvement, in recurrent cases and in severe cases with blebs and vesicles, we believe that the drug may be used with advantage. Just how the drug acts beneficially in these cases we are unable to say, but must remark in passing that if mercurochrome is as inferred from previous communications of extreme aid in combating streptococcic infection, our results would lead us to suspect other causative agents than streptococci of erysipelas.

Points of Interest in the Diagnosis and Treatment of the More Common Diseases of the Blood[1]

BY HAROLD W. JONES, M.D.
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At present one meets with difficulty in satisfactorily presenting the subject of diseases of the blood. This is largely the result of the dearth of exact knowledge concerning the origin of the blood elements, concerning their various functions, and the method or methods of their ultimate destruction. Until these points are made clear the origin of diseases that affect the hematopoietic system must be more or less obscure. Accordingly we find that the etiology of the leukemias, infectious mononucleosis, purpura hemorrhagica, hemophilia, acute hemolytic jaundice, splenic anemia and pernicious anemia is unknown. Recently there has been considerable discussion about the so-called reticulo-endothelial system, which is composed of the spleen, bone-marrow, hemo-lymph glands, and küpfer cells. There are those who hold that acute hemolytic jaundice is caused by altered splenic function with a resultant hyperphagocytic action, that pernicious anemia is due to a hyperphagocytic action of the entire system, that aplastic anemia results from a hypogenetic action of this system, and that polycythemia is the result of a failure of the hematopoietic system to destroy red blood cells. In all of these conditions we find points in favor and points against these theories, and they will have to be seasoned by much more of fact before they can be accepted generally.

We are not, however, so much concerned to-day with how these diseases occur as how they can be recognized and treated. In the past so much time has been spent in the recognition of the types of cells and the changes in the hemoglobin and red blood cells that the similarity of clinical features in the various blood diseases has often been overlooked. It is my desire to present the more common blood diseases in such groups as they seem to fall into because of symptoms, symptom-complexes or signs which they have in common with one another.

The first group includes those diseases in which subcutaneous hemorrhages in the form of petechiæ, purpuric spots, ecchymoses, and hemorrhage from mucous surfaces are striking features at some time during their course. These are purpura hemorrhagica, acute lymphatic and myeloid leukemia, chronic lymphatic and myeloid leukemia, Hodgkin's disease, and splenic anemia.

Purpura hemorrhagica, now called essential thrombocytopenia because of the great reduction of blood platelets, stands out as the most characteristic example of this

[1]Read before the Lancaster County Medical Society of Pennsylvania, May, 1924.

group. This condition occurs most frequently in young girls; it may be of a fulminating character with a duration of only a day or so; it may continue for weeks, disappear for a time, only to return; or it may recur at intervals throughout the entire lifetime of the individual. Petechiæ, purpuric spots, ecchymoses, plus hemorrhage from any or all mucous membranes, moderately enlarged spleen and a secondary anemia of increasing severity are the outstanding clinical features. The capillary resistance test of Hess—that is, the appearance of petechiæ above and below an applied tourniquet—is positive; the coagulation time is normal or nearly so; the bleeding time is greatly prolonged, ten minutes to several hours. The bleeding time is estimated by free puncture of finger or lobe of ear, noting time of appearance of blood, blotting blood but not forcibly removing same, and when no more appears the time is noted. Normally this is one to three minutes. The anemia usually presents the characteristics of a secondary anemia, but in the severe cases it often has many of the points found in the blood picture of pernicious anemia. Finally the blood platelets are greatly reduced in number. The normal blood platelet count is placed at from 250,000 to 350,000 per c.mm.; in purpura hemorrhagica the number is usually below 60,000 per c.mm. Although this is an important feature, clinical evidence is rather against this being the cause of the condition. It has been found that the platelets are increased immediately after splenectomy, but return to the low level several days later and remain at this point long after the other blood elements have returned to normal. This disease is most often confused with hemophilia, arthritic purpura, acute lymphatic leukemia, scurvy, and pernicious anemia.

Hemophilia occurs only in males; there is a bleeder history, the spleen is seldom enlarged, petechiæ and ecchymoses are uncommon, the capillary resistance test is negative, the blood plates are normal in number although not normal in function, the bleeding time is normal, and the coagulation test is greatly prolonged in most cases.

From other purpuric disease it is differentiated by the absence in those conditions of a prolonged bleeding time and a normal or nearly normal platelet count.

From acute lymphatic leukemia it can be differentiated by a study of the blood smear and the total white blood cell count, also the reduction of blood platelets is usually greater in purpura.

In scurvy there can usually be found the history of improper diet; petechiæ and ecchymoses are not common, the blood plates and bleeding time are normal.

Splenic anemia, Hodgkin's disease and pernicious anemia are only confused with purpura when the patients present, usually in the terminal stages, the hemorrhages into the skin and from mucous membranes. In splenic anemia and pernicious anemia the bleeding time is seldom greatly prolonged and the platelet count is usually higher, while in Hodgkin's disease we find the general glandular enlargement.

The next group for consideration is that in which are placed the diseases that are characterized by general glandular enlargement plus splenic enlargement. These are chronic lymphatic leukemia, Hodgkin's disease, acute infectious mononucleosis, and sometimes acute leukemia.

Chronic lymphatic leukemia is the most characteristic disease of this group. It occurs most frequently in adult males of from thirty to fifty years. It runs a course of from six months to ten years. The cause is unknown. The onset is insidious, although it may often be traced to some infection about the head or neck. The superficial lymph nodes enlarge, as do also the deep abdominal and mediastinal glands. The spleen is moderately enlarged. At first there is little or no anemia, but as the disease progresses the anemia increases until in the later stages it is very marked. In this stage gastric hemorrhage, epistaxis and petechiæ may occur. Sometimes an aleukemic interval ensues when the blood picture returns to normal or nearly normal, although the increased percentage of lymphocytes is seldom changed. An acute infection may produce an aleukemic interval. During such a period the diagnosis is

difficult to make. The diagnosis of the usual case of chronic lymphatic leukemia can be made by the blood picture. The average white blood count is 100,000, of which 95 per cent are small lymphocytes. There is commonly a secondary anemia which varies in severity with the stage of the disease. Hodgkin's disease resembles it most closely, the greatest difficulty arising during an aleukemic period. At such a time a positive diagnosis of Hodgkin's disease can be made by the excision and histologic study of one of the enlarged glands. In the usual case, however, the blood picture is sufficient to make the diagnosis.

Acute lymphatic and acute myelogenous leukemia occur in young adults and are rapidly fatal in from a few days to three months. Their onset is usually sudden and often preceded by sore throat or some infection about the head and neck. Severe anemia is rapidly produced. Hemorrhages into the skin and from mucous surfaces are common. The superficial cervical lymph nodes and spleen are usually involved. Gradually other glands may also become enlarged; however, in the fulminating cases the spleen and lymphatic glands may be normal in size. We find that the blood picture shows a marked secondary anemia, although in very severe cases it may have many points that resemble the primary type of anemia. The usual white blood cell count is from 40,000 to 100,000, and the differential study shows from 60 to 90 per cent primitive lymphocytes.

Acute infectious mononucleosis is a disease described by Longcope within the past three years. It occurs most frequently in young male adults. Its incidence is not great, but this is probably due in part to a lack of recognition of the condition. The onset is almost always with infection about the head and neck, most commonly sore throat and a diffuse pharyngitis; not simply a tonsillitis. The patient usually displays a temperature of the continued type, seldom going above 102° and frequently ranging only from 99° to 100°. There is marked weakness. The superficial lymphatic glands and spleen are enlarged. The duration of the acute symptoms is approximately three weeks. Even after the fever has disappeared the spleen and lymphatic glands remain enlarged. The disease has not proved fatal. In the blood picture we find little or no change in the red blood cells and hemoglobin. The white blood cells usually number from 12,000 to 25,000, with a differential count of from 20 to 50 per cent primitive lymphocytes.

Acute lymphatic leukemia and acute mononucleosis have many similar features, so that a diagnosis is often difficult without a blood count; in fact the patients formerly seen with mononucleosis were diagnosed as acute leukemia. The points of similarity are the onset with infection about the head; the presence of fever; prostration and enlarged spleen; generalized lymphatic enlargement; and the presence in the differential picture of the primitive lymphocytes. The points of difference are as follows: Acute leukemia is frequently accompanied by hemorrhages into the skin and from mucous surfaces. It is characterized by a rapidly produced anemia. The white blood cells are greater in number. The percentage of primitive lymphatic elements is greater, and the mortality is 100 per cent.

The next group for consideration is that in which we find diseases characterized by splenic enlargement, viz., chronic myelogenous leukemia, polycythemia vera, splenic anemia, acute hemolytic jaundice, lymphatic leukemia, Von Jaksch's anemia, and Gaucher's disease. In a typical case of myelogenous leukemia the diagnosis is not difficult; the blood picture being diagnostic. The duration of the disease is from six weeks to six years. Usually the onset is insidious, and often the first symptom is a sense of abdominal fulness, due to the enlarged spleen. As the disease progresses a secondary anemia develops. All the white blood cell elements are greatly increased. An average total count is 300,000 per cubic millimeter. At times the white blood cell count may be greater than the red blood cell count, and the blood becomes milky in appearance. We find from 20 to 60 per cent myeloblasts and myelocytes and 10 per cent to 20 per cent eosinophiles in the differential count. As in lymphatic leu-

kemia, an aleukemic interval may occur at any time. The spleen is usually very large, often reaching the pelvic rim, while the lymphatic glands are usually not affected. Splenic anemia (Banti's disease in the later stages) is often difficult to differentiate from myelogenous leukemia during an aleukemic period. By making repeated blood counts the striking features present in the leukemia are soon observed.

In splenic anemia we frequently find a very large spleen and a marked secondary anemia. The white blood cells are usually normal in number and the differential count shows no marked change except the presence of nucleated red blood cells and a few myelocytes In the later stages when there is cirrhosis of the liver and ascites, petechiæ, epistaxis, gastric and intestinal hemorrhage, some difficulty may be experienced in differentiating clinically from purpura hemorrhagica and even from pernicious anemia, but by careful consideration of the various tests already mentioned as characteristically positive in these conditions, a diagnosis can be made.

Acute hemolytic jaundice may be congenital or acquired. I will consider the acquired type. As the name implies, the jaundice is produced by hemolysis. The disease may extend over a long period, with the only sign a yellowish coloring of the sclera, or it may present itself as a fulminating type with marked jaundice, hemoglobinuria and a rapidly produced anemia. With this is found a rise in temperature, increase in respiratory and pulse rate, marked weakness, and an enlarged spleen. The anemia often presents the features of a primary or pernicious anemia. This, together with the jaundice, the presence of urobilin in the urine, the increase in stercobilin in the feces, and the splenic enlargement, all make the diagnosis difficult.

The differential diagnosis is based on the following points: In acute hemolytic jaundice the fragility of the red blood cells is greatly increased, while in pernicious anemia the fragility is normal or diminished. In acute hemolytic jaundice a microcytosis is common, while in pernicious anemia we find a macrocytosis. In acute hemolytic jaundice the reticulated red blood cells often number from 20 to 25 per cent, while in pernicious anemia such an increase is seldom found. In acute hemolytic jaundice the Van den Bergh test gives a more strongly positive indirect reaction than is found in pernicious anemia. In acute hemolytic jaundice megaloblasts are seldom found. The volume index is greater than one in pernicious anemia, while in hemolytic jaundice it is usually less than one. In pernicious anemia the presence in the history of sore tongue, the presence of achlorhydria gastrica and the nervous phenomena are of distinct importance. Acute hemolytic jaundice has also been confused with subacute bacterial endocarditis. In this latter condition we find fever, rapid pulse, enlarged spleen, marked weakness, and slight jaundice. The presence of hemoglobinuria, the increased fragility of the red blood cells, an increase in reticulated cells and continuously negative blood culture, and the absence of signs of acute cardiac diseases are points in favor of the diagnosis of hemolytic jaundice. Hemolytic jaundice must also be differentiated from obstructive jaundice. A large percentage of patients with hemolytic jaundice have gall-stones, and an attack of hemolytic jaundice is often ushered in by abdominal pain. In hemolytic jaundice the jaundice is more rapidly produced; the spleen is enlarged; there is hemoglobin in the urine; there is increased fragility of the red blood cells; there is usually a severe anemia and the Van den Bergh test gives a positive indirect reaction, while in obstructive jaundice it gives a positive direct reaction.

Pernicious anemia is often confused with malignancy of the stomach; severe secondary anemia, locomotor ataxia; cardiorenal disease, with the anemia of streptococcic septicemia, with bothriocephalus latus anemia, and with hemolytic jaundice. Although there are many points of value in the study of the blood picture, it is not sufficient to make a positive diagnosis. The presence of the high color index, the

leukopenia with a relative lymphocytosis, the presence of megaloblasts and a macrocytosis, are all important. From a clinical standpoint the following features are helpful in making a diagnosis of pernicious anemia: The history of sore tongue or the presence of an atrophied smooth tongue, lemon-yellow color, the preservation of body weight, the history of attacks of diarrhea, the presence of an achlorhydria, and the nervous phenomena such as numbness and tingling of the extremities, ataxia, absence of knee-jerks, and multiple neuritis.

In the grouping of these diseases we find that certain phenomena prominent in one disease also occur in others; that in nearly every disease of the blood the spleen is enlarged; that in the leukemias of the lymphatic type the lymph glands as well as the spleen are enlarged; that in the most severe states hemorrhage into the skin and from mucous surfaces occurs commonly; and finally, that all the diseases of the blood except hemophilia may have their onset with an acute infection about the head and neck. With so many characteristics in common one naturally looks for a single cause for all the blood diseases. The infectious theory has much to support it, but as yet no one has been able to discover the true cause of these conditions.

Treatment.—The treatment of the blood diseases is palliative and curative. They are naturally divided into those diseases which are fatal, no matter what treatment is used, and those which respond to the proper form of treatment.

I. Acute myelogenous and lymphatic leukemia:

1. Arsenic is of little value.

2. Radium and *x*-ray may prolong life for a short period.

3. Splenectomy has proven to be useless.

4. Blood transfusion is of little value; its use is attended with severe reactions.

II. Chronic myelogenous and lymphatic leukemia:

1. Arsenic is helpful in treating the anemia.

2. Benzol in doses of one to four cc will reduce the number of white blood cells, but its administration must be carefully watched so that the red blood cells are not greatly affected.

3. Splenectomy is of little value.

4. Radium and *x*-ray applied to the spleen have done more to prolong life than any other measure and should be used in each case.

5. Blood transfusion is not productive of good results and reactions are common.

III. Hemophilia:

1. The bleeding can be stopped by whole blood transfusion.

2. The subcutaneous or intravenous injection of 10 to 20 cc of 30-per-cent sodium citrate solution reduces the coagulation time and stops the bleeding. It may be necessary to repeat the injection.

3. Hemostatic serum and ordinary horse serum have been used with a certain amount of success.

IV. Purpura hemorrhagica, acute hemolytic jaundice, splenic anemia:

1. In purpura hemorrhagica and acute hemolytic jaundice splenectomy has produced brilliant results in a large number of cases.

2. In splenic anemia splenectomy is of great value when it is used in the earlier stages of the disease; that is, before there is marked cirrhosis of the liver and ascites.

3. Blood transfusion will stop the oozing from the mucous membrane in severe cases of purpura hemorrhagica. It will save the patient's life, and by its repeated use the blood elements are increased to such a point that an operation of splenectomy can be performed with safety. After the operation, blood transfusion can be used to shorten the convalescence and to combat any untoward effects of the operation. It is also possible with repeated transfusions of whole blood not only to stop the hemorrhage but to bring the hemoglobin and red blood cells to a normal figure, to reduce the bleeding time to normal, and gradually increase the number of blood platelets. The platelets are the last of the blood elements to reach a normal figure.

V. In acute hemolytic jaundice blood transfusion is useful in relieving the unto-

ward symptoms, in preparing the patient for operation, and in shortening convalescence following the operation.

VI. Acute infectious mononucleosis is best treated by general measures such as rest in bed, light nourishing food, Fowler's solution in increasing doses and syrup of ferrous iodide, or hydriodic acid if iodides are tolerated by the patient.

VII. Pernicious anemia. The treatment of pernicious anemia is a separate problem:

1. General measures, rest in bed, forced feeding. A high-protein, low-fat diet is usually best tolerated by the patient.

2. Dilute hydrochloric acid and pepsin aid digestion.

3. Arsenic in the form of Fowler's solution can be administered internally.

4. Sodium cacodylate may be given subcutaneously.

5. Arsphenamine in 2/10-gramme doses may be used intravenously. These drugs have proven of great value.

6. Germanium dioxide has failed to produce good results.

7. Injections of whole blood subcutaneously in 20-cc doses will increase the red blood cells and hemoglobin. It can be used without typing. It should, however, be drawn and injected at once so that coagulation does not occur. Between transfusions, or when a donor cannot be procured, whole blood is of value.

8. Blood transfusions will save life, will prolong life, and will carry the patient along until a remission occurs, or they may stimulate remission. A few patients go on to what appears to be a cure.

9. Splenectomy has not been productive of good results.

BLOOD PICTURES AND TESTS.

	Purpura.	Acute Lymphatic Leuk.	Acute Infectious Mononuc.	Chronic Lymphatic Leuk.	Aleukemic Interval.	Hodgkin's Disease.
Hb.	18	20	84	40	68	60
R. B. C.	1,200,000	980,000	4,680,000	2,460,000	3,600,000	3,200,000
C. I.	.7	1.1	.9	.8	.9	.9
W. B. C.	12,000	78,000	12,400	160,000	8,600	12,000
P. N.	62	2	20	4	15	54
S. L.	28	8	36	95	90	36
L. L.	.....	90	40	.....	.....	.....
Mon.	6	.....	4	1	3	8
P. E.	4	.....	.....	.....	2	2
Myel.	.....	.....	.....	.....	.....	.....
Bl. plates	10,000	188,000	300,000	200,000	.....	.....
Coag. time	7 min.	18 min.	5 min.	8 min.	.....	.....
Bl. time	36 min.	9 min.	3 min.	4 min.	.....	.....

	Chronic Myelogenous Leuk.	Aleukemic Interval.	Splenic Anemia.	Pernicious Anemia.	Acute Hemolytic Jaundice.	Secondary Anemia, Chlorotic Type.
Hb.	48	64	30	28	28	40
R. B. C.	2,500,000	3,400,000	1,500,000	1,200,000	960,000	4,200,222
C. I.	.9	.9	1.	1.2	1.2	.48
W. B. C.	540,000	7,200	8,000	3,200	4,000	11,000
P. N.	24	40	56	40	50	62
S. L.	2	20	28	50	42	30
L. L.	.....	.....	.....	.....	.....	.....
Mon.	2	10	10	8	6	8
P. E.	20	.....	4	1	2	2
Myel.	52	30	2	1	.....	.....
				Megaloblasts. Macrocytosis. Fragility normal or less. Van den Bergh indirect positive plus 1. Vol. index, 1 plus.	Microcytosis. Fragility increased. Van den Bergh indirect positive plus 4. Reticulated R.B.C. 20%. Vol. index, 1.	

Reticulated red blood cells are young erythrocytes normally present in the blood ½ to 2 per cent of R. B. C.

Stain is made up of saturated solution of brilliant cresyl blue sodium oxalate 1.6 gms., distilled water 100 cc.

Technique: Draw blood to point 1 in W. B. cell pipette; stain to point 1.1. Mix for 10 minutes; place drop on slide; make smear; dry; examine with oil immersion lens.

Blood platelets are normally present in number of 250,000-350,000 per c.mm.

Stain: Brilliant cresyl blue 0.1 gm. sodium citrate 3.8 grs., formalin 0.2 cc to 100 cc distilled water.

Technique: Draw stain to point 0.5 in R. B. C. pipette and blood to point 1; then stain again to point 1.01; mix; place on counting chamber. In 10 minutes the platelets will be seen as small 1-3 microns, bodies stained a faint lilac.

Fragility test for red blood cells: Nine test tubes ⅜ in. by 4. Draw blood to point 1 on W. B. C. pipette twice and place in 1 cc of normal saline; this constitutes the blood emulsion. Place 0.1 cc of blood emulsion in each tube; place 0.1 cc distilled water in tube 1; increase 0.1 cc in each tube. Place 0.8 cc normal saline in tube 1; decrease 0.1 cc in each tube. Incubate 2 hours at 37° C.; stand in ice-box over night. Normally the hemolysis begins in tube 5 and is complete in 7. Increased fragility is indicated if the hemolysis begins earlier.

Van den Bergh test to differentiate obstructive and non-obstructive jaundice. It will detect the presence of 1 part of bilirubin in 500,000 parts of blood serum.

Solution A.

Sulphanilic acid, 1 cc.
Hydrochloric acid, 15 cc.
Distilled water, 1000 cc.

Solution B.

Sodium nitrite, 0.5 cc.
Distilled water, 100 cc.

Mix fresh 25 cc of A and ¾ cc of B.

Technique: To 1 cc of blood serum add 1 cc of mixture.

If a reddish violet color appears immediately it indicates the presence of obstructive jaundice.

If negative proceed as follows: To 1 cc of blood serum add 2 cc of 95-per-cent alcohol and centrifuge. To 1 cc of supernatant fluid add 1 cc of solution mixture; if a bluish-violet appears at once it is positive for non-obstructive jaundice.

Macrocytosis—Increased number of large R. B. C.

Microcytosis—Increased number of small R. B. C.

Treatment of Buboes by Cautery Incision[1]

BY S. W. MOORHEAD, M.D.
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[From the Urological Service, Hospital of the University of Pennsylvania.]

The proposed method of treating buboes consists in abstaining from operative procedures till an abscess has formed, the evacuation of pus by means of the cautery instead of the knife, and in case of need the performance of lymphadenectomy as a secondary operation.

The perfected plan is the result of slow evolution during the past five years. It was noted that primary adenectomy, while occasionally giving brilliant results, not infrequently resulted in a painful, suppurating wound which required several weeks of hospitalization, followed by more weeks or months of treatment in the dispensary, the dressings being painful for the patient and time-consuming for the surgeon.

Free incision of an abscessed node usually causes within twenty-four hours a marked increase in the local inflammation. The day following such an operation the patient is frequently suffering as much pain as before the incision of his abscess, and is reluctant to submit to the manipulations necessary for the cleansing and dressing of his wound. Moreover, throughout the after-treatment the changing of gauze packing or other material necessary to keep the wound open is a matter of dread, while the loss of time necessitated by frequent dressings is not a matter of indifference to either patient or surgeon.

Evacuation of the pus through a small punctured wound, with an after-treatment of irrigations with Dakin's solution or some other antiseptic, is but little to be preferred; again the course is tedious, the wound tends

[1]Read before the Philadelphia Urological Society, May 26, 1924.

to close before suppuration has ceased, and the dressings are attended with a certain amount of pain.

When opened by means of a cautery incision the pus is evacuated through a tract whose surrounding lymphatics have been sealed or destroyed by heat. Consequently there is no resultant cellulitis. A further advantage is freedom from pain following the operation; the nerves having been destroyed by the heat patients suffer little or no pain in their wounds, frequently reporting the following day that they have had no pain whatever. Lastly, though possibly its importance merits earlier citation, is mentioned freedom from the necessity of painful dressings. Because of the searing of the tissues early healing is impossible; consequently there is no need for the insertion of gauze or other drainage material. When the method was first used it was expected that this would be the case during the first few days only, but it was found that by the time the slough had separated, thereby enlarging the wound, the drainage tract had become so firmly established that there was no tendency to heal till the infection had been overcome.

Any form of cautery may be used for the operation—electric, Paquelin's, or less conveniently a metal instrument heated in a flame. Whatever the type selected, a hole approximately half an inch long is slowly burned through the skin into the abscess cavity. It has been found that the progress of the case is most satisfactory when opening has been delayed till the abscess having perforated the capsule of the node has approached the skin. The progress of cases wherein the treatment has been applied to deep-seated nodes containing but a few drops of pus has been less uniformly satisfactory, convalescence having sometimes been protracted and more or less painful; the only cases with deep nodes wherein the treatment is now being applied are those suffering so much pain that relief is imperative.

The majority of patients on whom cautery incision has been performed have an uneventful convalescence, the superficial wound healing only after the deep infection has been overcome. During this time the dressings are so simple and easily performed that we have been in the habit of letting the patient perform them himself at his home, thereby saving his time and lessening materially the work of the dispensary. Occasionally the nodes are so large or show so little tendency to break down completely that an adenectomy is indicated. In cases with this less desirable outcome the cautery none the less serves a useful purpose, for the drainage thereby afforded, of from one to four weeks' duration, shortens the time of hospitalization from several weeks to an average of five and a half days. The following case history is illustrative:

T. W. (A4116) applied for treatment at the dispensary of the University Hospital on June 16, 1923. He had large, bilateral, suppurating buboes which had prevented his working for the preceding three weeks. Cautery incision under local anesthesia was performed. He was dressed in the dispensary seven times between the 18th of June and the 10th of July. On the latter date he was admitted to the ward for adenectomy, which was performed the following day, Wednesday. He was discharged from the hospital Sunday, July 15, his fourth postoperative day, to return to the dispensary for dressing, which he did five times during the following month; the dispensary treatments, of course, were supplemented by dressings at his home. He was able to return to work the day his buboes were incised, and the day following his discharge from the ward. In other words, during the two months he remained under our care he lost but five days from his work.

For the cautery operation nitrous oxide is the anesthetic of choice. However, local anesthesia can be used, and was used in the majority of the cases whereon this paper is based. The most efficient method is to inject 10 to 20 mils of half-per-cent novocaine, with one or two drops of adrenalin, at the site of incision, midway between the surface of the skin and the abscess, allowing

at least fifteen minutes to elapse before starting the operation. The injection of the solution into the inflamed area has not seemed to increase the cellulitis. If adenectomy becomes necessary it should be performed under a general anesthetic. It is rarely necessary to enlarge the skin wound, the cautery opening usually being of sufficient size to admit the enucleating finger.

1523 PINE STREET.

The Treatment of Puerperal Sepsis

BY BARTON COOKE HIRST, M.D.

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The Editors of the THERAPEUTIC GAZETTE have handed me an article by J. R. Campbell Canney in the *British Medical Journal* of August 30, 1924, entitled "Some Suggestions in the Treatment of Puerperal Sepsis," and have asked for a comment on this article.

That author's conclusions are as follows:

1. When fever appears in the puerperium, having excluded maladies outside the pelvis which may cause it, it is far safer to give an anesthetic and carefully examine the patient's pelvis than to "wait and see." If intrauterine sepsis is present, explore the uterus and take steps to empty it or clean it, or both. To wait and see if the fever will subside may mean waste of precious time.

2. A so-called sapremia is quite often the precursor of the most virulent septicemia, and anyhow a sapremia will not be improved by leaving even small and removable fragments of placenta or membrane *in situ*, if they are poisoning the patient.

3. The septic uterus will not involute, but the modified Carrel-Dakin treatment, assisted perhaps by drugs, will help involution better (in my opinion) than anything we have at our disposal.

4. If antistreptococcal serum is to be used, use it frequently until the temperature falls.

5. Further adjuncts are "peptone shock" and intravenous eusol.

6. Take a culture from the endometrium and from the blood, as a vaccine later may be of value, especially if prepared from the blood.

7. Pay careful attention to posture in the nursing of these patients. Fowler's position will aid drainage, whereas the supine position will tend to dam back secretions. Similarly micturition and defecation in a complete sitting position are useful aids.

8. In early infection of the adnexa, the modified Carrel-Dakin method may possibly prevent the necessity of abdominal section, and will certainly speed up recovery.

9. Perform all manipulations or instrumentation with extreme gentleness whenever possible, and practice asepsis most punctiliously.

10. Sew up all tears of soft parts immediately. Puerperal sepsis is a type of wound infection which will not improve by watching and waiting. Operative measures and certain forms of medication have scope, though still limited, in its treatment. There is no panacea, though we hope it may appear. Until it does, each case will require careful study with a view not only to its own cure, but also to the discovery of a real antidote to this scourge.

The views expressed in this paper are so contrary to those accepted in this country that it is not likely the article will influence the treatment of this condition by physicians here, but appearing in a journal with the reputation and authority of the *British Medical Journal* these conclusions might have some influence on the practice of general physicians who do not have special knowledge of this subject.

Such views put into practice would have

deplorable results. The era of meddlesome interference with the interior of an infected uterus is ancient history in America. Numbers of lives were lost by the so-called "curettage" of the puerperal womb until we learned better. The insertion of a double tube with continued irrigation of the uterine cavity has also been tried in this country and has been abandoned.

Occasionally, but rarely, it is advisable to explore and to evacuate an infected uterus, but to resort to this procedure as a routine measure will have the most unfortunate results.

Autogenous vaccines in streptococcic infections, which constitute 95 per cent of "puerperal fevers," have also been tried with disappointing results.

The advice to sew up all tears of soft parts immediately, if meant for infected cases, is also most injudicious.

Altogether the statements and advice in this article are not to be recommended to the profession in America.

What Shall We Do With and For Our Cases of Gall-tract Disease?—A Study in Contrasts

BY B. B. VINCENT LYON, A.B., M.D.

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(Concluded)

XIV. NON-SURGICAL TREATMENT OF CATARRHAL CYSTIC DUCT BLOCK AND ATTACKS SIMULATING CHOLELITHIASIS.

Many patients who have comparatively early gall-tract inflammation or infection, especially when associated with dysfunctions in physiology, may be completely relieved of their trouble with an actual cure of their condition, without resorting to surgery, even though their clinical symptoms may be acutely severe. This is well demonstrated by the following case report, selected from several of a generally similar character:

Case No. 1568, male, 33 years. This patient, a doctor, was first seen by me in November, 1923. On the evening of June 3, 1923, he had had a severe attack of epigastric pain followed by nausea and vomiting lasting twenty-four hours. Pain eased toward morning, but returned after a cup of tea. Moderate tenderness and rigidity in right iliac fossa and mid-epigastrium, but none in gall-bladder region. His appendix was removed the next day, on June 4. The other organs were palpated, but not inspected. Gall-bladder normal to palpation.

On July 1, while recuperating at Atlantic City, three hours after a dinner of littleneck clams, soup, bread and butter, he had severe epigastric distress, followed in two hours by terrific pain, which had moved from epigastrium to right costal margin, where it remained for twenty-four hours. He vomited yellowish-green bile at hourly intervals for twenty-four hours, when acute pain subsided, leaving a sore, stiff feeling, which made him bend over when he walked. There was moderate tenderness and upper right quadrant rigidity. Surgeon considered the attack due to indiscretion in diet. Right costal margin soreness and stiffness, associated with pain in right suprascapular region, lasted for six days. In another week the attack repeated itself. One week later it skipped the epigastric distress pain stage, and started with sore, stiff feeling under right costal margin, lasting three or four days. From then until November, 1923, these two types of attacks have occurred weekly.

The last attack on November 6 occurred

with excruciating pain under the right costal margin at tip of ninth costal cartilage after milk toast, hot malted milk, soda biscuits and glass of milk, and lasted for forty-five minutes. Hot-water bag gave almost instant, but partial, relief. He felt better for two hours, when pain recurred, lasting practically all night, requiring morphine. For two weeks previous his stools had been very pale yellow. Renal studies were normal.

On physical examination in November, 1923, the scleræ were moderately jaundiced. The upper right quadrant was of the surgical type with exquisite tenderness localized to the region of the gall-bladder, which was apparently palpable, although upper right rectus rigidity and muscle spasm made this somewhat doubtful. There was moderate leucocytosis. *X*-ray study failed to visualize gall-bladder or stones. Duodenal bulb was persistently spastic and irritable.

Drainage findings failed to recover "B" fraction, and microscopy gave characteristic findings of cystic duct obstruction due to catarrh. Culture from "C" bile recovered staphylococcus aureus and B. coli.

After surgical conference with Dr. Deaver, operation was urged, but the patient demurred, and wished to go to any length to avoid reoperation, since he had received almost instant relief following the first drainage. He was therefore treated as follows: Bed-rest, ice-bag, liquid diet, and daily drainages for thirteen days. During this period no "B" fractions were recovered, although the inflammatory microscopical picture had greatly diminished and the oleaginous material had lessened. Within forty-eight hours the abdominal findings and leucocyte counts were normal. He returned to his own city under instructions to keep up the gall-tract drainages twice a week, with colonic irrigations once a week; meat and fat-free diet; and use of bile salts; together with autogenous vaccine administration. This plan he followed out.

He reported in person in March, 1924, and stated that from the time of instituting treatment he had experienced complete relief, had had no further attacks, and that he had in recent drainages recovered "B" fractions, at first pathological, but gradually returning to normal. He had been able to resume full practice within a month, and was eating everything within sensible limits. A final message from this patient in October, 1924, states that he has remained perfectly well.

Discussion.—I recognize that it is not possible to accomplish such results in every patient of this general type. Nevertheless, we have had an excellent average of recoveries without surgery, which have lasted over a period of several years. Certainly surgery could accomplish no better end result. Many of these recoveries have been truly brilliant.

I have noticed a distinct reluctance on the part of most doctors to undergo reoperation, and willing to go to almost any length to avoid this if other measures can be used which will relieve their distress and restore them to health. I think this point is worthy of very sober reflection, along the principle that "what is sauce for the goose is sauce for the gander."

In regard to this case report, I wish to call attention to two points in particular, both of which I believe to represent clinical entities hitherto unrecognized.

The first of these closely mimics the clinical picture of gall-stone colic. I believe it to be a colic due to dysfunction of Oddi's sphincter and an overdistended gall-bladder, whereby there occurs a simultaneous spasm of the duct sphincter at the moment when attempted contraction on the part of the gall-bladder takes place. This produces a rise of intraduct and intracystic tension, which, acting on an inflamed mucosa, causes the colicky pain.*

The second point concerns a differentiation of cystic duct obstructions. The obstruction can be produced by catarrh from within the duct, by adhesions, by stone impaction, or by lymphatic gland enlargement producing pressure. I have

*This conception has received some operative substantiation as discussed in Case Report No. XXIII in "Non-Surgical Drainage of the Gall Tract," published by Lea & Febiger.

placed them in their relative order of frequency within my personal experience. These are all mechanical types of obstruction. The second and third forms require surgical correction. There is a fifth form that may be due to "physiological block," as described by Smithies. These types can be differentiated.

Cystic duct obstruction due to catarrh gives a characteristic microscopical slide.

The flocculations in the bile appear most numerous just before the "B" fraction is recovered, if the cystic duct block is partial only. Where it is complete, no "B" bile is recoverable. The flocculations are more compact and often spiralled and microscopically are found to consist of very dense mucus, heavily encrusted with amorphous bile salts, occasionally bacteria and pus cells. The most characteristic diagnostic factor is a peculiar oleaginous material, which melts out from the masses of mucus and bile salts.* It is pale to bright yellow and oily looking, and grossly resembles globules of neutral fat, but conforms only incompletely to the usual chemical tests for fat. The evidence is accumulating that this material may be a fatty ester elaborated in some manner from unknown constituents within the cystic duct. This observation has been rechecked in a large number of cases. I believe it to be a reliable differential diagnostic finding for this type of obstruction. Experience has shown that it can usually be corrected by persistent drainage. Formerly I referred such patients to the surgeon. I believe now that many can avoid operation, if they are treated energetically by non-surgical drainage.

XV. NEWER TREATMENT OF CERTAIN FORMS OF CHOLECYSTITIS AND CIRRHOSIS OF THE LIVER.

Case No. 1062, male, aged 36, stated that when 17 he had "congestion of the liver." He was in bed ten days with high fever, nausea and vomiting, no jaundice. He recovered after free purging with calomel and salts. Six years ago he developed a sense of soreness under right costal margin and explosive after-meal belching.

His drainage findings demonstrated well-defined cholecystodochitis with static "B" fraction and a heavy mixed growth of staphylococcus aureus and non-hemolytic streptococcus.

Dr. Manges reported in his *x*-ray that "the gall-bladder casts a positive shadow, considerably more dense than normal. I believe it definitely pathologic. There are no stone shadows present. No *x*-ray evidence of any organic lesion of stomach or duodenum."

The patient had associated cyclic attacks of prostrating severe supraorbital headache, partly due to eye-strain, since then partly relieved by correction in glasses, but partly of the biliary migraine variety with terminal bile vomiting. Intermittent drainages improved him considerably, but with a tendency to relapse. He was then placed on a period of continuous drainage for five days, and thereafter fifteen-hour night and morning drainage every thirty-six hours over a period of twenty-one days. Two and a half gallons of bile were extracted and drainages cleared to normal. Recheck *x*-ray by Dr. Manges at the conclusion of this drainage period failed to demonstrate the pathological gall-bladder easily seen one month earlier. Complete symptomatic improvement has persisted for over a year. Final cultural recoveries showed elimination of the staphylococcus aureus, but persistence in non-hemolytic streptococcus. Vaccine gave definite focalizing reactions felt under right costal margin, reproducing the pain distress. His bile drainages are now perfectly normal.

Discussion.—This case illustrates what may be possible of accomplishment, not only as regards securing total symptomatic improvement, clearance of all pathological objective findings, but, most important, the demonstration by *x*-ray of the actual disappearance of a so-called "pathologic gall-bladder." I believe that a number of cases of this type may have the beginning of a portal or a connective tissue cirrhosis of the liver, which can be most practically aided by continuous drainage of the liver system.

*A full description of this condition will be found on page 239 of "Non-Surgical Drainage of the Gall Tract," published by Lea & Febiger.

Many of these patients give suggestive antecedent histories.

One patient, Case No. 1222, who had previously fractured his ribs at the right costal margin, later developed a typical gall-bladder syndrome requiring operation, and at the removal of the gall-bladder it was noted that an early cirrhotic change had begun in the liver of this young man of 30.

Case No. 896, another young male, aged 28, had had typhoid fever eighteen years previously, with two cholecystitis relapses, and since then recurrent jaundice. He was first seen in October, 1919. In 1917 his appendix had been removed and gall-bladder digitally explored and stated to be normal. His gall-tract drainage findings showed a low-grade catarrhal cholecystitis, but very evident pathological "C" fractions in deepened liver biles, and short columnar cell exfoliations. He was subjaundiced as to skin, with very distinct scleral icterus. Although athletic, playing squash and tennis, he had periods of what he called "biliousness," when he became mentally dulled, had difficulty in concentrating and performing his work as an advertising writer, attacks which improved by self-administered calomel purging.

He relapsed frequently after periods of temporary improvement by intermittent drainage, and insisted that he would not finally recover until his gall-bladder had been removed. He became obsessed with this point of view, and although his clinical and *x*-ray findings were insufficient to warrant surgery, on his insistence a gall-tract operation was done in February, 1922. The gall-bladder itself was grossly negative; its walls were of normal thickness and easily collapsed on simple handling. No stones were present. The pancreas, however, to the surgeon, seemed distinctly hardened, and the liver was mottled and finely scarred with connective-tissue radiations and appeared definitely cirrhotic. The liver substance itself was harder than normal. The gall-bladder was removed. Cultures were sterile. Microscopic tissue study showed a comparatively slight interstitial cholecystitis.

On account of the psychic factors in his case, it was considered advisable to withhold from him information as to the state of his liver, and to reënforce his own point of view that the removal of his gall-bladder would effect a total cure, in order that he might gain the maximum amount of health recovery from the operation itself. His postoperative follow-up, therefore, was carried out according to the orthodox principles of dietetically and hygienically managing an early hepatic cirrhosis.

He returned from another city two years later (February, 1924) and voluntarily stated that his operation had failed to relieve him. Although better as a result of his gymnasium work in winter and daily golf during the summer, strict adherence to a sensible diet, low in animal protein and fats, he is still distinctly subjaundiced and has a corresponding diminution of bile in his stools. His liver and pancreatic functional tests are distinctly subnormal.

Discussion.—I believe that this patient has received the maximum benefit that he will receive as a result of his cholecystectomy. The question of his future management concerns more active treatment of his liver by intensive periods of continuous gall-tract drainage once or twice a year.

Clearly a cholecystectomy in a case such as this cannot be expected to do more than eradicate a local catarrh or focal point of infection. It seems possible, however, in the light of a somewhat limited and more recent experience with continuous drainage of the liver, to accomplish, in a very practical manner, more than can be done by surgical procedures or solely by our customary methods of dieting and drugging the early and recognized cases of hepatic cirrhosis.*

*This patient was given a period of continuous drainage during October, 1924, with immediate subjective and objective improvement and a clearing in jaundice. This jaundice must have been due to intrahepatic duct obstruction since the common duct drained freely. He was given 30 hours of continuous drainage out of each 48 over a period of eighteen days. During this time not quite five gallons of bile was removed from his duodenum. He weighed 121 pounds on admission and 124 pounds on discharge at the end of his eighteenth day. Time will have to elapse to determine whether such a procedure is permanently beneficial. The details of this case and the final result will be reported elsewhere later on.

XVI. NEWER TREATMENT OF HEMOLYTIC JAUNDICE WITH SPLENOMEGALY.

Case No. 1072, male, aged 25, was first seen in October, 1920; a typical case of hemolytic jaundice with splenomegaly and historical suggestions of familial incidence. He was complaining of nothing else than an overpowering drowsiness with depression bordering on melancholia, dizziness, frontal headaches, and constipation.

His skin and scleræ were moderately jaundiced. His liver was enlarged downward to 10 cm. below the costal margin. Its rounded edge was hard. A hard and greatly enlarged spleen with rounded edge extended into the left abdomen as far as the navel.

His drainage findings demonstrated a hemolytic streptococcic infection of the liver and gall-tract passages. His gall-bladder fraction was most unusual; a greasy thickish, paint-like bile, a deep-red brown, turbid, with many muco-pus flocculations. His "C" fraction, a Burgundy-red color, darker than a hemolyzed blood, was transparent and thinner, and flowed rapidly and under considerable pressure. The color of "B" and "C" fractions was different from anything I have seen in any other type of case.

His blood findings showed a high-grade fragility, with microcytosis and increase in skeined and reticulated blood cells to 3 or 4 per cent, common to the disease. Likewise, while his urine was bile-free, he had a very high urobilin excretion in his feces, amounting to 122,000 units.

This case was classified as a hemolytic jaundice with splenomegaly, catarrhal infective cholecystodochitis, and biliary cirrhosis.

He was given no treatment of any kind whatsoever except drainage of the gall-tract at weekly intervals and the autogenous vaccine of hemolytic streptococci. After eleven drainages he had made remarkable progress. The liver edge was barely palpable at the costal margin and the spleen so much smaller as to be difficult of demonstration. His jaundice was lessened, his depression, dizziness, frontal headaches gone; he was keen and alert and no longer falling asleep at his work.

This patient continued to take drainage every three to four weeks during the last six months of 1921. This he did himself at home somewhat under protest, for he "felt too well." During 1922 he had only four drainages and continued to improve. By February, 1923, his liver had been reduced to normal size and the spleen edge palpable about one-half inch below the costal margin. He had gained 14 pounds of weight and was free of jaundice. While there was very definite marked clinical improvement, the blood findings at the end of 1922 still showed increased fragility with high urobilin excretion in stools.

On May 1, 1924, this patient reported in person. He had had no drainages for about two years, stopping them voluntarily, and against advice, because he felt perfectly well. He was bright, keen, concentrated well, was cheerful, very optimistic, and had been working full time without any fatigue.

He had dropped off about 8 pounds to 164½. He was still moderately jaundiced, particularly noticeable in scleræ. Physical examination of his abdomen showed liver edge not palpable. Spleen edge was palpable to one inch below left costal margin at tip of tenth and eleventh costal cartilages, edge sharp, moderately hardened, instead of rounded as formerly. Otherwise physical examination was negative.

He was urged to seriously resume drainage treatments if only at monthly intervals, if he will do no more—either that, or undergo splenectomy. I think it is very encouraging that he had been maintained in such improved health and physical findings for two years since discontinuing treatment. He must still be considered to have hemolytic jaundice, but in a stage described by Chauffard as being more icteric than sick. A period of continuous drainage, as described above, might prove even more beneficial.

XVII. ILLUSTRATION OF A CASE OF CHOLELITHIASIS IMPROPERLY AND UNWISELY SELECTED FOR NON-SURGICAL DRAINAGE, TOGETHER WITH RISKS ATTACHED THERETO.

Case No. 1179, male, aged 29, seen in June, 1921, was complaining of acute attacks of upper right quadrant pain requiring morphine. He had had sixteen attacks during twenty months, all severe and usually after midnight, with forced vomiting, but had never been jaundiced.

Drainage findings showed "B" fractions loaded with crystals, pus cells, mucus, and streptococci. Leucocytosis of 11,040. Roentgen-ray study negative for gall-stones or visible gall-bladder or other pathology.

Diagnosis: Infective cholecystodochitis with potential calculi, streptococcic infected tonsils, infective gastritis, appendiceal irritation. Treatment: Removal of tonsils, with culture, non-surgical drainage, combined autogenous vaccine from tonsils and gall-tract. Restriction in fats. Surgery was not advised.

This plan was carried out. Twelve therapeutic drainages were given between June and October, 1921, with encouraging symptomatic improvement, but objective findings showed excessive crystals, pus, and exfoliated epithelium. Though Roentgen ray was negative for stones, operation was urged and declined because patient had become pain and distress free.

During January, 1922, this patient had a severe attack of gall-bladder colic, with fever of 102°, and sweats. Operation revealed two large round stones in a very inflamed, thickened gall-bladder, densely adherent to liver and surrounding structures, and diseased appendix. This patient did not return for postoperative drainage recheck, but a follow-up report just received states that he is perfectly well.

Discussion.—1. This case strongly illustrates the wrong selection of a patient for whom non-surgical drainage could not be considered as a curative measure inasmuch as the objective findings showed that his condition was still present, although he was symptom-free. It would have been better judgment to have insisted upon earlier operation, for there were no surgical contraindications.

2. Diagnostic error of Roentgen ray inability to demonstrate stones (even negative shadows), a pathological gall-bladder, or inflammatory adhesions.

3. The ability to preoperatively diagnose by non-surgical drainage potential calculi, and thus strengthen a presumptive diagnosis based on history.

4. The connection between cause and effect—streptococcic tonsils, streptococcic gall-bladder, and stones.

5. The danger of attempting to treat such a gall-stone case by non-surgical drainage beyond a period intended to prepare the surgical field.

6. Such a patient should certainly resume postoperative non-surgical drainage to guard against relapse.

XVIII. TREATMENT OF POSTOPERATIVE CHOLANGITIS.

The following case illustrates the usefulness and life-saving possibilities of non-surgical drainage, especially when given continuously in cases of grave *postoperative* cholangitis and toxic hepatodochitis, upon whom multiple gall-tract surgery has been practiced without favorable results and for whom further surgery can offer little or nothing more.

Case No. 1159, female, 60 years of age, was referred in April, 1921, complaining of jaundice, gradually deepening for two years, recurring chills and fever, vomiting spells, attacks of violent epigastric pain. She had had seven operations in fifteen years, six major abdominal, including double suspension of kidneys, appendectomy, cholecystectomy, and two choledochostomies. The gall-tract operations were done in 1915. Since 1918 she had had intermittent jaundice, chills and fever, with continuous jaundice for two years.

She was a "bad risk" patient, extremely weak, with bad kidneys, damaged pancreatic function, pronounced indicanuria and antacid gastritis. Biliary tract drainage

recovered 60 cc of creamy yellow pure pus, foul odor, with many masses of bile pigment crystals and swarming bacterial colonized flora of B. coli.

Diagnosis: Postoperative infective cholangitis with potential reformation of calculi in dilated common duct. She was a "bad risk" patient from every standpoint. No further surgery was advised inasmuch as surgery had accomplished all that was conceivably possible without favorable result.

Treatment outlined: Sodium salicylate, substitutive gastric and pancreatic products. B. coli vaccine. Intermittent drainage; later, continuous drainage, as patient's strength improved.

Colon bacillus vaccine gave marked local, general, and focalizing reactions, increasing the jaundice for twenty-four hours, and producing chills, fever, and malaise. Drainages were frequently followed by acute exacerbations in pain, which gradually lessened. Pus and acute inflammatory débris with muco-pus flocculi were constantly recovered. This treatment was kept up for eight months, with progressive improvement. Three years later this patient has remained well, does a full day's work, has remained jaundice-free, and has had no further attacks of pain, chills, fever, or sweats.

Discussion.—Continuous medical drainage of the biliary tract undoubtedly saved the life of this patient at a time when her recovery was despaired of, and has permitted her to resume her livelihood, whereas previously she had been a complete invalid. We have had several equally brilliant results in similar cases in which surgery had done its utmost without avail. This case illustrates, too, the importance of a systematic non-surgical drainage check-up in all cases in which the ducts or liver are suspected of harboring an infection, in order to prevent a cholangitis relapse. When recognized early, non-surgical drainage has proved a most efficient method of curing many such patients, and thus preventing a great deal of unnecessary suffering and multiple operations.

Even in a communication as long as this it has not been possible to include a discussion of several types of gall-tract disease in which non-surgical drainage has been used with considerable success, either alone or as an adjunct measure.

XIX. OTHER DISEASES, MORE OR LESS ASSOCIATED WITH GALL-TRACT DISEASE, IMPROVED BY NON-SURGICAL BILIARY TRACT DRAINAGE.

There are other conditions, not pertinent to this paper, which have been very considerably improved by non-surgical drainage of the biliary tract. Among these, our experience has shown that improvement can be secured in many cases of pernicious anemia by adding this measure. Recent communications from other physicians have shown that their experience concurs with our own.

So, too, certain cases of diabetes have been found to show definite clinical improvement when non-surgical drainage has been added to the former dietetic management of this disease. Since the introduction of insulin, further experimental use with drainage procedures has been temporarily postponed.

Certain forms of intractable neuritis and progressive osteoarthritis, or various forms of rheumatism, in which all extra-abdominal focal infection factors have been removed, have been greatly improved by drainage of the biliary tract, combined with colonic irrigation and vaccines.

Infestations with giardiasis and other intestinal parasites, as well as typhoid carriers, have been successfully treated.

Certain patients complaining primarily of asthma, in whom uninterpretable sensitization tests are found, will be greatly relieved of their paroxysms.

Some cases of persistent hiccough have been permanently cured by one drainage, others may require several. This procedure should be tried in the epidemic form of hiccough. There is evidence now suggesting an infection involving the duodenum and gall-tract in many of these patients. The lives of some desperately ill postoperative hiccough cases have been saved by biliary

drainage and transduodenal lavage, after all other measures had failed.

CONCLUSIONS.

The great fundamental truth we must realize is that gall-tract disease is not always, perhaps rarely ever, a clinical entity confined alone to the gall-bladder and bile ducts. Very frequently it involves to a high degree the liver itself, as well as the pancreas, the duodenum, and the gut, especially the colon.

The etiological factor is a variable one. Sometimes it is a bacterium associated with catarrh, and the end result, a bacterial toxemia plus focal infection, requires surgical removal of the gall-bladder and appendix. Too frequently, notwithstanding the removal of the gall-bladder, the infection still remains in the liver and ducts, and such cases untreated will relapse on account of secondary hepatitis and cholangitis. Sometimes the disease manifests itself as one of new growth involving the head of the pancreas, the bile ducts or the gall-bladder, and requires prompt recognition and adequate surgery. Sometimes the process is neither an infection, a new growth, nor a disease producing a foreign body (gall-stones), but a chemical or metabolic toxemia of the liver and gut, which often gives rise to profound constitutional disturbances, but with a notable absence of pain in many cases. Secondary toxic phenomena involve the cardiac muscle, the pancreatic cells and their secretions, and the functional integrity of the kidneys. In some cases these variable etiological causes are found merged.

The toxic factor or factors are elaborated from a number of sources, but primarily excreted by the bile emptying into the duodenum. In order to exit from the body by way of the feces this poisoned bile has to traverse 28 to 30 feet of gut. During this journey a certain proportion of the toxic factor is reabsorbed by the mesenteric lacteals and emptied finally into the portal vein, to be again carried to the overburdened liver and its toxically fatigued cells. There it has to be again filtered out and reëxcreted in the bile. This vicious circle revolves endlessly until the liver cell becomes more and more damaged and can no longer elaborate a normal healthy bile, while at the same time structural changes take place within the liver, producing various forms of cirrhosis, which by degrees obstruct the portal circulation and produce the later manifestations of the end results of liver disease (ascites, etc.). The various clinical phenomena, both objective and subjective, which take place as the disease progresses as a whole, are too complex to be elaborated in this paper.

Only when this fundamental truth of the protean nature of gall-tract disease is sufficiently learned, then, and then only, will we realize that our modern treatment must be as comprehensive and as many-sided as is the disease itself. *A priori*, early recognition of the beginnings of this condition in the stage of disturbed physiology or dysfunction or early disease is the great essential. This can only be recognized *definitely* by means of the duodenal tube and can be corrected by non-surgical drainage alone.

Inasmuch as the normal physiology of emptying the gall and pancreatic tracts depends upon food entering the duodenum at stated intervals, meal skipping or the following of various fantastic food fancies to combat obesity, etc., are often a prime producing factor of the disease, creating biliary-pancreatic stasis and fertilizing the field for subsequent catarrh and infection. Therefore meal skipping should be made taboo.

Thus we take our first rational step to prevent gall-stone formation. This, however, is by no means the only factor in gall-tract disease, and if we eliminate its pain colics and obstructive features, which occur in a relatively small per cent of all cases, the calculous state is of less importance than many of its other aspects.

When the disease is well established we must learn that its successful treatment must be comprehensive and concerns itself then with the adoption of:

A. *Dietetic measures*, suitable to the variations in chemistry of the individual

patient, but frequent and small feedings, with a reduced fat and animal protein content, until improvement takes place.

B. *Surgical correction,* where possible, of the established pathology and the end products of the associated inflammatory reactions to infection (removal of gall-stones, resection of gall-bladder, release of adhesions, anastomoses between gall-bladder and duodenum for pancreatic obstructive new growth, etc.). We must recognize, however, that the surgical side of the problem deals only with removal of one of the end products of well-established gall-tract disease, and *not the disease itself,* and that other factors, such as disease within the liver, the bile ducts, the pancreas and the gut may still exist after surgery has done its part, and these remaining factors are often beyond the scope of judicious surgery, but can be successfully managed by adding

C. *Non-surgical drainage of the biliary system,* which includes the pancreas. The essential value of this form of treatment lies in the fact that, in addition to keeping the ducts freely open, any residual catarrh or infection can be drained and thus prevent cholangitis and hepatitis. Furthermore, and most important, the poisonous element in the bile recovered is removed from the body *before it is reabsorbed* during the passage through the gut. Therefore a certain percentage of the toxic load formerly brought back to the tired liver cell is lifted and cell rebirth or refunction encouraged. Intermittent drainage once to thrice a week will accomplish a great deal. In the highly toxic case continuous drainage for three or four weeks, as I have recommended,* will often bring marvelous results.

D. By the use of autogenous multiple strain vaccines combined from various sources (teeth, tonsils, sinuses, bronchial tree, bile, colon) to attempt to raise the immunity against the total infection.

E. Colonic irrigations, properly given by an expert, twice to thrice a week for a month or two will be of additional aid in detoxicating the patient.

F. The use of only such oral therapy as is definitely indicated by a study of the individual patient, but reduced to the minimum.

G. The education of the patient to readjust his life and living conditions *when possible* to secure intelligent coöperation in combating his disease. This embraces rest, physical exercise, hygiene, vacation periods, and, in certain cases, abdominal support and physical therapy.

Epitomized, all of this means that surgical measures have their limitations, and non-surgical measures theirs, but, by combining them intelligently, much more can can be done to prevent gall-tract disease and to cure or ameliorate the condition both in its early and late stages.

*Non-surgical Drainage of the Gall Tract, Lea & Febiger, 1923, p. 459.

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The Ketogenic Diet in the Treatment of Epilepsy.

In the *American Journal of Diseases of Children* for July, 1924, PETERMAN makes a preliminary report on the use of a ketogenic diet, as proposed by Wilder, in the treatment of epilepsy. He holds that the treatment may be given a general trial. It must be remembered that the object of the diet is to produce acidosis by reducing the starch intake. It is desirable at the same time to enforce a rigid daily regimen.

The most favorable results have been obtained in cases of petit mal, which form of epilepsy does not respond so well to phenobarbital. His series of cases is small, and the treatment has been short. Conclusions with regard to the results of treatment of this disease should be most conservative, since so much irregularity exists in the interval between attacks, and since so little is actually known of the cause. Further investigation is in progress and will be reported.

Editorial

SOMETHING AS TO RENAL TUBERCULOSIS.

The advances which have been made in the methods by which renal tuberculosis can be discovered have been noteworthy during the last ten years. The condition is probably more common than is generally thought, and much discussion has arisen as to the method in which infection occurs, but Frankau, who is the Assistant Surgeon to St. George's Hospital, London, states that in only 5 per cent does the infection arise from the prostate and bladder, and in the remaining 95 per cent it is primarily renal, and that when pus and tubercle bacilli are found in the urine, in the vast majority of cases the infection is renal and not vesical.

In some instances careful palpation of the abdomen may show that one or other kidney suffers from local tenderness, although it must be borne in mind that mere enlargement to a moderate degree may be due to increased activity of a healthy kidney to compensate for the diseased one.

In the male, careful examination of the scrotal contents may reveal a primary or secondary epididymitis. So, too, the patient's lungs should be carefully examined, and the chest *x*-rayed to determine if there is a primary focus of tuberculous infection which is comparatively slight in degree, but which is represented by a more active process in the kidney.

Last of all, it goes without saying that a cystoscopic examination will determine definitely whether the infection is vesical or renal, and, if but one kidney is involved, by ureteral catheterization its involvement may be determined, thereby indicating that the other kidney is competent. When unilateral renal infection is present and the other kidney is healthy, as shown by various tests to be capable of taking up a double burden, we believe it is generally taught that a lumbar nephrectomy should be carried out, removing at the same time as much of the ureter on that side as is possible, particularly if it is infected. If the bladder is involved as well as the kidney, Frankau believes that little can be done until the bladder condition is improved, and thinks that complete rest in bed with small doses of tuberculin should be carried out. In his experience the bladder improves sufficiently after six or eight weeks to permit cystoscopy and ureteral catheterization under general or spinal anesthesia.

In those cases in which there is a secondary epididymitis, he thinks that it is unnecessary to remove the testicle, since the operation upon the primary focus followed by a course of tuberculin will often result in healing, unless, of course, the testicle and epididymis have suffered extensive destruction. In those cases in which a primary focus is found in some other portion of the body, Frankau does not believe that if this lesion is quiescent or healed its existence contraindicates nephrectomy, although an active lesion in the lungs should lead one to be most cautious or to consider that interference is prohibitive.

In all cases in this writer's opinion, while the patient is still in bed after operation, tuberculin injections should be given. He advises the use of tuberculin B. E., and states that as a rule in an uncomplicated case the dose may safely be 1/20,000 mgm., and if no reaction results the dose is increased each week until a maximum dose of 1/100 mgm. is arrived at by the expiration of twelve weeks. Where there are other tuberculous lesions the doses must be smaller. The chief point is to give doses which will induce the smallest possible amount of reaction, and, to determine accurately what the reaction is, the doses should be given the same time of day and a four-hourly chart kept for thirty-six hours to check the degree of effect. Having reached

the maximum dose the treatment should be continued for six months or longer, but during the later months these injections need not prevent the patient from pursuing his ordinary occupation. At least two months should elapse after bacilli and pus have disappeared from the urine before the tuberculin is stopped.

Frankau is very optimistic in regard to this line of treatment, stating that the patient rapidly loses his symptoms, gains in weight, and the bladder symptoms rapidly disappear, although sometimes bladder irritability continues. He emphasizes the point that in his opinion irrigation of the bladder does no good and may do much harm, and adds that in the hands of a competent surgeon the operative mortality in nephrectomy for tuberculosis is less than one per cent. In uncomplicated cases he claims that a permanent cure can be expected in 85 per cent.

In the presence of bilateral infection, no operative interference seems justifiable; the only hope for improvement lies in general treatment with a prolonged course of tuberculin. In these cases, also, he believes that irrigation of the bladder or instillation is to be avoided, as it may produce irritation and be a cause of secondary pyogenic infection. He has little confidence in hexamethylenamine and suggests that the patient take internally one of the three following prescriptions:

Tincture hyoscyamus, m. xx;
Tincture opium, m. v;
Potassium citrate, gr. xx;
Chloroform water, enough to make an ounce.

This is to be taken three times a day after meals.

Or,

Oil of sandalwood, m. xx.

Three times a day after meals. This is best given in ten-minim capsules.

Or,

Methylene blue, gr. ij.

In capsule or cachet three times a day after meals.

So, too, as a suppository, morphine gr. ¼ and extract of belladonna gr. ½ may be placed in the rectum to relieve nocturia.

In those cases where both kidneys are involved, he advises much smaller initial doses of tuberculin B. E., rarely exceeding 1/500,000 mgm., and giving the dose at four-day intervals, gradually increasing in the course of weeks to 1/50,000 mgm., and finally, when several months have elapsed, giving 1/100 mgm. once a week. As a rule he finds that the time which must elapse between the minimum dose and the maximum is six months, and with this precaution reactions do not occur. Should a reaction occur, the dose must be immediately cut down. After the lapse of six months a weekly dose should be given for another six months.

While recognizing that bilateral renal tuberculosis is a very fatal disease in children and young adults, nevertheless Frankau thinks that with prolonged and careful sanatorium and tuberculin treatment there is a definite chance of prolonging life and occasionally a complete cessation of symptoms occurs, and with this cessation tubercle bacilli and pus in the urine also disappear.

AN ANTIDOTE FOR ARSENIC, BISMUTH, AND MERCURY POISONING.

We think that our readers will be interested in a report made in a recent issue of the *British Medical Journal* by Semon upon the employment of sodium thiosulphate in the treatment of subacute intoxication by these three drugs. As he well points out, every man who has a large number of venereal cases to treat is occasionally caused great anxiety by reason of the development of arsenical jaundice or dermatitis, or, in other instances, a bismuth or mercurial stomatitis becomes an annoying symptom.

Semon's report is to the effect that intravenous injections of sterile solutions of chemically pure sodium thiosulphate are an efficient method of combating the toxic effect of these drugs, and tells us that as

long ago as 1920 Ravaut, in *La Presse Médicale,* recommended this salt, and more recently in January, 1923, McBride and Dennie confirmed his results in severe arsenical dermatitis, the skin difficulty being shortened from months to weeks and the efficiency of intravenous injection being proved greater than any other method of treatment. Semon has chemically pure dehydrated sodium thiosulphate put up in sterile ampoules of varying strengths for this purpose, but believes that one containing 0.6 gm. or approximately 10 grains of the sodium salt is usually efficient. The doses are given on alternate days until the symptoms clear up, the quantity of water used not being in excess of 5 cc.

In this connection the interesting point arises as to how sodium thiosulphate can act efficiently. One theory has been that an insoluble sulphide is formed. Semon admits that he is unable to solve this question, but is satisfied with the clinical fact that the distressing symptoms of mercurial and bismuth stomatitis are rapidly relieved, usually by no more than five injections. He records cases of bismuth stomatitis, mercurial stomatitis and arsenical jaundice so treated with advantage, as well as a case of acute dermatitis after sulpharsphenamine.

An interesting illustration of the value which he has found exists in this method of treatment is his record of a case of a man who received 0.6 of neoarsphenamine intravenously. Because the injection was given by a novice the needle slipped through the posterior wall of the vein and part of the injection escaped, with the usual result of causing severe pain, so severe that the patient fainted. The syringe was immediately disconnected, leaving the needle in place, and 8 cc of distilled water containing 0.75 gramme of sodium thiosulphate injected so as to mix with and dilute the arsenical solution. Seven days later there was no trace of local infiltration to be seen and no pain on deep pressure over the site of the injection, which was, however, ecchymotic where the blood had escaped from the vein. Our readers, some of them at least, will recall similar cases in which such an accident has produced symptoms for a long period of time, and this local use of sodium thiosulphate is particularly interesting in this connection.

As arsenical jaundice is possibly the most dangerous and persistent of all these forms of subacute poisoning, the result obtained by Semon in the treatment of such a case is particularly interesting. This patient complained of nausea and depression and had repeated attacks of nausea and vomiting, and the urine, which contained no albumin before the injections, now contained a trace, together with bile and a few granular casts. Six injections in this case had been given before the symptoms developed. Recognizing that time is all important in these cases, he immediately administered an intravenous injection of 0.75 gramme of sodium thiosulphate in 10 cc of water, and then on each following day injected from 0.45 to 0.5 for nine doses until a total of 4.7 grammes of the salt had been given, without developing any symptoms of intolerance and with a constant diminution in the general symptoms and in the jaundice, the fading of the latter being visible from day to day.

As an interesting confirmation of the fact that such injections really produce results a study of the blood sugar was carried out. When fasting it was found to be 0.115 per cent; half an hour after an ounce of levulose had been given it was 0.155; one hour after, 0.2; and one and a half hours afterward, 0.19 per cent. These figures were thought to indicate severe hepatic inadequacy. Twelve days later the fasting blood sugar was 0.12; half an hour after levulose was given, 0.15; one hour after, 0.15; and one and a half hours after, 0.14, the latter being considered the normal figure. This patient was discharged from treatment on the thirteenth day after his admission.

Our readers will recall that in the October issue of the GAZETTE this subject was covered in an interesting and complete manner by the papers of Greenbaum, Groehl and Myers.

THE ROLE OF FEVER IN THE MODIFICATION OF DISEASE.

As long ago as 1896 the writer of this editorial contributed to the pages of the THERAPEUTIC GAZETTE a paper bearing this title. It will be recalled that thirty or forty years ago the profession held a very generally accepted idea that fever was a process inimical to health and that it ought to be actively combated. This was the period when manufacturers were promoting antipyrin and acetanilid, or, as it was then called, antifebrin, and while neither of these products could have become so popular had the profession in general not regarded fever as an evil, nevertheless the propaganda of these German concerns aided much in disseminating views favorable to antipyretic measures.

In the address referred to it was pointed out that as long ago as the time of Hippocrates that individual expressed the belief that fever was a protective process, and from time to time since then members of the profession have reverted to this idea.

It would unduly prolong this editorial note were we to go into too much detail. It is true that hyperpyretic temperatures of 108° to 110° are distinctly harmful, but there is almost no evidence that temperatures less than this, if maintained for a short time, and they are rarely maintained for a longer time, are definitely deleterious.

Various experiments have shown too that animals can bear febrile temperatures which far exceed the normal if there is no additional strain thrown upon the organism by an infectious process.

The point that we wish to make is not so much that fever is not harmful, but that it is, in many cases at least, a protective mechanism occurring when warm-blooded animals or men attempt to resist infection. We know full well that when animals and men receive an excessive dose of virulent infectious parasites fever may not occur, or if it does, is often very mild. Perhaps no better illustration of this can be found than the relatively low temperatures seen in elderly persons when stricken with pneumonia. The low temperature and the low leucocyte count both indicate a grave prognosis in those persons, because they indicate that the individual is not fighting against his infection.

Perhaps the most noteworthy experimental indication of these facts was shown by experiments carried out by Loewy and Richter in 1895, who found when a fever was produced by puncture of the corpus striatum, that if infection was then induced by the pneumococcus, the coccus of erysipelas, and the microörganism of chicken cholera, so that the temperature of the animal was 106° F., death failed to occur as soon as usual even though one hundred times the ordinary fatal dose was injected; and further, that when three times the fatal dose of pneumococcus was injected, the animals with the highest temperatures survived. If swine plague was used as the infectious agent the course of the disease was slower than usual if fever was present.

So, too, Wagner in 1891 showed in chickens infected by anthrax that after several days no bacilli could be found in their tissues if they were febrile, whereas if the chickens were kept cool by the application of cold they all promptly died with typical anthrax manifestations.

It is scarcely necessary to go on quoting points in further substantiation of the views just expressed, but it is interesting to note a research which has recently been carried out by Heath which is referred to with approbation in an editorial in the London *Lancet*. This editorial also refers to the fact that for many years a heightened temperature was regarded as an evil in itself, but it then proceeds to point out that Rolly and Meltzer in 1908 once more showed that in infectious conditions some degree of pyrexia was certainly beneficial for animals that were febrile being able to withstand infections fatal to normal controls.

Heath's work was done upon human beings, largely upon himself, and with typhoid patients. So far as his own body,

was concerned, he administered typhoid vaccines. He found the course of the fever ran parallel with the reduction below normal of antibody in the blood. At first glance such a reduction of antibody would seem to indicate that fever is disadvantageous, but Heath interprets his results as indicating that this reduction is the actual cause of the fever and that the fever in turn is designed to speed up the production of more antibody to replace that which is used.

We trust that at some future time he may be able to present evidence as to the actual effect of antipyretic drugs upon this condition. At present he believes that their use should be entirely put aside.

A NOTE AS TO RENAL THERAPY.

We have on more than one occasion pointed out that a great change has taken place in the last few years in our conception of what can be done and what ought not to be done in the treatment of acute and chronic nephritis of both types. It has become increasingly clear that even if there are albumin and casts in the urine, this fact does not necessarily indicate that all the functions of the kidneys have deteriorated. In some instances their ability to eliminate salts is impaired, and dropsy due to the retention of these salts is an effort on the part of the body to maintain normal saline tonicity in the blood and tissues. In other instances the elimination of urea and uric acid is deficient while the elimination of salts is well maintained, and in still others the kidneys are able to get rid of a certain amount of solids but seem to have lost their ability to some extent at least to get rid of liquid. Heretofore, and to a certain extent the condition is still true, physicians have used practically only three classes of remedies in the hope of giving relief to a nephritic: digitalis as a diuretic, the potash salts for the same purpose, and, considering it as a drug, large quantities of water for the purpose of flushing the kidneys.

From what we have said it is evident that if a kidney has lost its ability to eliminate fluid, the pushing of large amounts of water must be deleterious. If they have lost their ability to eliminate salts the administration of the so-called potash salts as diuretics is not only futile but harmful, and it is equally true that unless it can be shown, by a high non-protein nitrogen content of the blood, that the educts of an animal diet are retained, it is foolish to deprive the patient of all meat as has hitherto been done, not only because it will depress him, but also because it will deprive him of energy which he needs, and upset his nutritional balance. The day is past when Basham's mixture and digitalis can be given as a routine method. Each case of acute or chronic nephritis must be studied as an individual instance of pathological change in the kidney.

These facts are still more emphasized by a recent research published by Stieglitz, who tells us that there is a definite change in the chemical reaction of the secreting function of the kidney cells during its periods of activity.

It is interesting to note that when acid urine is being secreted by the cells of the uriniferous tubules, these cells are alkaline in reaction, and if alkaline urine is being secreted, they are acid, and as the acidity or alkalinity of the urine is increased, these acid and alkaline reactions continue to increase in these tubules. On the other hand, in kidneys which are diseased, these cells are constantly acid, and the producing of an alkaline urine by the administration of drugs does not reverse the acid reaction of the cells as has just been stated. In other words, as Stieglitz puts it, the free administration of alkalies to nephritics is not to be carried to the point of producing constant alkalinization of the urine, because, as already indicated, this tends to increase the acidity of the secreting cells. On the other hand, he thinks that a moderate use of alkalies whereby the urine is kept practically neutral may be distinctly advantageous.

UNSUSPECTED SOURCES OF LEAD POISONING.

Many years ago a distinguished teacher in one of the medical schools of Philadelphia told his class that whenever they met with a case of chronic illness (and he might have said acute illness as well) in which the diagnosis was obscure, they should think of the possibility of syphilis on the one hand or lead poisoning on the other.

Within the last three decades a number of excellent publications in book form have appeared on this subject, notably by Oliver, and cases have been reported in which poisoning occurred as the result of very brief exposure and from sources which seemed most unlikely. Among others there have been cases where a seamstress has chewed silk thread, weighted with lead in order to bring a greater price on the market; others in which an epidemic of lead poisoning, and many deaths, resulted from the use of chrome yellow in the place of eggs in the making of cakes and confectionery; still others from the utilization of lead pipe through which was carried water which failed to make a deposit of carbonate of lime on the inner part of the pipe. Another type of case has been reported from the use of hair dyes containing lead. Recently Foster has reported the case of a woman who consulted a number of physicians because of attacks of serious abdominal pain and also pains in her arms. No one suspected that she had lead poisoning, but finally it was discovered that this was the case and that the source of the poison was a face powder. In other instances so-called facial creams or complexion improvers have been found to contain sufficiently large quantities of lead to be toxic, and in still other cases patients sleeping in a room which has recently been painted may present symptoms of lead poisoning entirely apart from the irritation of the respiratory passages which may be induced by the fumes of turpentine. Again cases of poisoning have arisen from foods cooked over burning wood which had been used for some other purpose and which was heavily coated with lead paint.

It will be recalled that the symptoms of lead poisoning may resemble in many instances locomotor ataxia, although in reality the condition is a pseudo tabes due to peripheral neuritis. It is also to be remembered that where the urine on being tested chemically does not contain lead, if moderate doses of the iodides are given for a few days lead will appear in the urine, and where no chemical examination is possible the microscopic examination of the blood may discover basophilic degeneration of the red blood corpuscles. What has been said in regard to the use of the iodides for the purpose of aiding elimination of the lead so that it appears in the urine indicates, of course, that this class of drugs is the most valuable means that we have for getting the poison out of the body, and it goes without saying that every effort should be made to discover the cause and to eliminate it so that further intoxication will not occur.

A POINT AS TO TONSILLITIS.

Our readers will recall that some months ago we called attention to a research in Baltimore by Bloomfield and Felty which seemed to indicate that the streptococcus hemolyticus is, almost universally, the cause of tonsillitis, and, as we all know, this streptococcus is by no means a benign organism as to the tonsillar tissues or the body in general.

We think it is of interest to call attention to a further study by Bloomfield and Felty which was designed to determine the mode of transmission of this infection to this particular locality. They had excellent opportunities for doing so because in addition to isolated cases they came in contact with an epidemic which involved a considerable number of patients living under identical conditions.

As a result of their investigations they conclude that aerial or droplet infection, as in coughing or speaking, is not existent

since the pathogenic germs are in the back portion of the mouth and do not come near enough to the lips to be discharged. They also found that even when such organisms were placed in the mouth the contamination of objects placed in front of the patient when he coughed or spoke did not cause their expulsion, although if the patient hawked, or coughed after hawking, such transmission might take place. They further conclude that in almost every instance the transmission must be by direct contact with the patient or be indirect with freshly contaminated objects. It may be pointed out that this has an important bearing upon the question of the necessity of isolating patients with tonsillitis, and it may have an indirect bearing upon the dissemination of scarlet-fever infection by discharges from the mouth.

THE REDUCTION OF SURGICAL MORTALITY.

By surgical mortality is meant that incident to operation, occurring during operation, or following shortly after, and in its time of occurrence traceable to surgical intervention. At one time the surgeon held himself accountable only for such deaths as occurred incident to anesthesia, shock, hemorrhage, or obvious infections. It is the custom at present to consider all deaths which are incident to or are hastened by operation, whether these be from pneumonia, asthenia, failing kidneys, cardiovascular breakdown, thrombosis, embolism, or apoplexy, as surgical. Such mortality as is incident to the removal of an inoperable cancer, which is shortly inevitable and which occurs weeks or months later in spite of clean healing, though doubtless precipitated by the operation, is not properly classed as a surgical death.

In view of the astonishing reduction in surgical mortality, even computed as it is by present standards, the surgeon is sometimes prone to attribute to himself a greater skill in technique than that possessed by his predecessors. If by technique is understood the entire organization of the operating room, its trained anesthetists and assistants, its complete modern armamentarium, and its perfected system of cleanliness, this claim is entirely just. If, however, there be a thought of greater manual dexterity there is good reason to doubt the soundness of this contention.

Probably the basal reason for the lessened surgical mortality is the larger diagnostic skill of both the general practitioner and the specialist. Incident to this lesions requiring mechanical means for their cure are detected at a much earlier stage of development, and are referred for treatment at a time when this is both easier and safer in application, and more fruitful in results.

A second and largely contributing cause for lessened mortality is incident to the general use of safer anesthetic agencies, and particularly to the administration of these agencies by those thoroughly trained in the best methods. Moreover, local and regional anesthesia is in its development and wider application producing its effect upon lessening surgical mortality.

Further, a better comprehension of shock and its appropriate treatment has saved many lives which otherwise would have been lost. Indeed this complication incident to operation is comparatively rare at the present time, and when it does develop there is no longer that abiding faith in the helpful influence of large doses of strychnia which have been abundantly proven to hasten rather than retard its progress.

A factor of comparatively modern development in lessening surgical mortality is that incident to the careful and rational preparation and the wise selection of that phase of the abnormal condition in which the vital resistance is at its highest attainable point and in which complications are least likely to develop. Thus the abdominal surgeon has learned not to operate as a rule during the acute course of pelvic inflammation. Those most experienced in the treatment of goitre are aware of the fact that surgical interference during an acute

toxic phase is likely to result fatally. Unless forced so to do surgeons avoid abdominal section in the presence of jaundice. It has been well proven that for the relief of acute intestinal obstruction the mortality is lowest if intervention stops at the relief of this obstruction. Prostatectomy is not now performed unless the kidneys are functioning freely. Operative mortality has been greatly reduced by attention to this one matter, *i.e.*, the adoption of such measures as shall secure and reasonably insure free elimination from the kidneys before any surgical intervention.

In the Mayo Clinic and elsewhere it has been shown that following treatment advocated by Plummer—*i.e.*, rest, free elimination, the administration of iodine—goitre cases in which any intervention would be attended by the greatest possible risk may be safely carried through. As a matter of record, the mortality has been reduced in these cases from 30 to something under 1 per cent.

The diabetic patient has long been regarded as a risk, and this quite aside from the greater tendency of the tissues of such a one to infection. The mortality risk has been reduced, according to Sistrunk (*New Orleans Medical and Surgical Journal*, August, 1924), from 30 to 6 per cent, incident to careful preparation, diet, and the wise use of insulin.

In the jaundiced patients, unless the urgency be great, the preliminary administration of calcium chloride and particularly the relief of obstruction in the simplest possible way are measures which markedly reduce the mortality.

Sistrunk points out the fact that gross overweight has a marked bearing on operative mortality, and advises, if time allows, preliminary measures to reduce the excess of fat by diet and careful administration of thyroid. When a serious operation is contemplated on a patient weighing more than 175 pounds the weight should be reduced.

Bearing on acute appendicitis, he notes that the risk of the operation performed in the first twenty-four hours is practically negligible. After forty-eight hours and until the fifth day he believes that certain patients stand a better chance of recovery without operation than with it. There will be many recoveries by operation performed at this time, but if the inflammation be of the type characterized by extension of tenderness, distention, and rapid pulse, the mortality would be lower under the so-called Ochsner treatment—to-wit, morphine and starvation—than by operation. If the pulse drops the sixth or seventh day the operation may be performed more safely.

Among the reductions in operative mortality especially noteworthy are those incident to the treatment of myomas and malignant growths of the uterus. Sistrunk also notes that the mortality has been greatly reduced and the end results much improved by treating cancer of the tongue by radium, the method being implantation of radium points and later local cautery incision in case this is indicated. In these cases cervical lymph nodes, if obvious, are excised.

THE DIRECT HERNIA.

"May you live long and be happy" is a form of greeting hallowed by the centuries and sanctioned by the usage of many peoples, and since happiness depends upon health, as much as does long life, the same wish is as adequately and more concisely carried by the expression, "Your good health." It has been accepted as inevitable that old age should carry with it certain inconveniences, disabilities or crippling and painful disorders, which though not necessarily shortening the span of life, make its enjoyment impossible. Thus cataract, loosening teeth, rheumatism, direct hernia, hemorrhoids, enlarged prostate, being more frequent in those past middle age than in those who have not yet reached this period, are often classed as due to vascular tissue degeneration or perversion incident to senility *per se*.

The ophthalmologist has restored vision to those aged ones who suffer from cata-

ract. The odontologist has given them teeth as useful, and more ornamental if not quite as comfortable, as those with which they were originally endowed. The internist has sought and often found and has removed foci of infection which were the underlying causes of rheumatism. The surgeon, not to be outdone, has removed the hemorrhoids and prostate with equal facility, safety, and success; and has operated upon the direct hernias with a considerable percentage of prompt recurrences.

Andrews has pointed out that direct hernia is due to an original deficiency in breadth of the conjoined tendon associated with a later developed weakness of the transverse fascia, such weakness as is common to all fascial and muscular structures with advancing years. The hernia forms a bulge, without a narrow neck, hence is in no danger of strangulation, has little tendency to increase in size, is readily kept comfortable and retained in place by a simple apparatus, and should not be subject to operation.

Hence it would seem wise to operate on the aged even as in the young for conditions which are remediable by surgery and which cause inconvenience, crippling, or pain. When, however, a young or old man presents himself with the bulge of a hernia direct from its beginning, conservative measures should be advised. If operation be undertaken this should include the suturing of a generous flap from the sheath of the rectus muscle over the weak spot.

Progress in Therapeutics

Medical Therapeutics

Rheumatism in Children.

ASHBY, in *The Practitioner* for May, 1924, states that the treatment consists in giving sodium salicylate at the earliest possible moment and keeping on with it until all active symptoms have ceased for some days. When salicylates are given in large doses, it is as well to add sodium bicarbonate in double the amount of salicylate; this keeps the urine alkaline and helps to avoid toxic symptoms. For a child of ten years old, 10 to 12 grains of sodium salicylate should be given every three hours at first, then gradually diminished to every four hours, and later to three times a day as the case improves. It is important to keep the bowels well open when the child is having salicylates.

Since rheumatism is liable to relapse it is well not to stop the salicylates too soon, but to continue with them in small doses for some time. As a prophylactic measure, he always recommends that five grains of sodium salicylate be given daily to any child who has had definite rheumatism during the wet, damp days in winter, and at any time that there is any sign of growing pains.

In some cases in which large doses of sodium salicylate have been given, persistent vomiting occurs. This quickly ceases when the salicylate is stopped.

Unhealthy tonsils should be removed to try and prevent further attacks. Rheumatic children should always be warmly clothed and have good waterproof boots. The stockings should be changed on coming in from a walk if there is any suspicion of dampness. Bathing and paddling at the seaside should be avoided except, perhaps, on very hot days, and then only for a short time. Careful watching at school is needed.

Once a child has had an endocarditis, the endocardium is always a weak spot and liable to further inflammation. A second attack is always more serious than the first,

and is likely to leave the child with a heart so badly damaged that he is a permanent cripple. There is much ignorance on the part of the public about the significance of rheumatism and growing pains in children, and many cases do not come under medical care until the heart is damaged.

A child who has had endocarditis needs careful supervision for many years. It is necessary to find out exactly what the heart is capable of in the way of work. Because a child has had endocarditis, it does not of necessity mean that he must be an invalid. We must endeavor to get the heart compensated, so that it is able to take on the extra work consequent to the disability caused by the endocarditis. The only way to do this is to train the heart muscle by gradual exercises.

All damaged hearts have a diminished reserve power behind them.

The great safeguard that prevents a boy doing too much exercise is that his willpower to exert himself, for example in a race, gives out long before he is really exhausted. A trained athlete will run himself really out on account of his willpower. A boy can never do this. It is a mistake to limit a boy's games at school more than can be helped, especially the less violent ones like cricket, tennis, and golf.

Suitable occupations must be found for children in after life if they have had heart disease of any kind.

New Facts in the Etiology and Treatment of Malaria.

In an editorial on this subject, the *Lancet* of May 24, 1924, states that with regard to the natural history of malaria so many new facts emerge that it is difficult at the present moment to appraise them all. The unicity theory of the origin of malaria, so tenaciously propounded by Laveran, has received its death-blow. There are three species of malarial parasites which invariably reproduce themselves on inoculation and remain true to type. Then again we learn that, contrary to expectation, the repeated subinoculation of malarial blood from man to man through more than twenty passages in no way alters the virulence or virility of the parasites, nor does the disease thus produced differ in any remarkable degree from that acquired by the bite of infected anopheline mosquitoes.

In the treatment of artificial inoculation malaria by quinine there is much cause for reflection, for the authors found, in accordance with previous workers, that inoculated malaria proved to be extraordinarily susceptible to the action of quinine—30 grains a day for three consecutive days being found sufficient to sterilize the patient of his infection. This rapid action is forcibly contrasted with the experience of Stephens and his colleagues upon malarial infections contracted during the war. On the other hand, the alleged prophylactic effect of quinine receives a severe blow from which it can hardly recover, for we learn that from abundant experiments the administration of this drug before the bite of an infected mosquito is quite useless, and that its administration must be continued for at least ten days after the infecting feed to prevent the disease from developing. In other words, it is evident that quinine is entirely innocuous to the sporozoites, and the conclusion is reached that the drug exerts it maximum action upon the young trophozoites in the blood-stream, and it is, therefore, most effective in primary infections. The mechanism by which a cure is produced is ascribed to production by the host of immune bodies in response to the antigen formation resulting from the destruction of a considerable number of parasites.

However important the facts related above may be to the tropical worker, possibly of even greater interest to the practitioner in this country is the impartial statement upon the value of the malarial treatment in general paralysis. Of 84 paretics, who have been observed for a sufficient length of time, 27.4 per cent have been discharged as provisionally cured, while an additional 20.2 per cent show distinct mental and great physical improvement. The exact mechanism by which this desirable result is ob-

tained by the malarial parasite is not at present by any means clear. If it is effected by a series of regularly repeated protein shocks we are left at a loss to understand how the cerebral sclerosis and the degeneration of the nervous tissue can be permanently affected.

The Liverpool School of Tropical Medicine has always maintained a reputation for accurate and conscientious scientific work, and this reputation has been fully maintained, if not augmented, by these remarkable and suggestive investigations, as well as by the lucid manner of their exposition.

The Treatment of Hyperthyroidism by the Roentgen Rays.

In the *American Journal of Electrotherapeutics and Radiology* for June, 1924, PFAHLER states that during the fifteen years in which he has been using radiotherapy in toxic goitres there has been a progressive change in the technique, and little is gained by discussing all the stages through which we have passed. At the present time the patient is placed in the supine posture with a pillow under the neck and the head thrown well back. Treatment is given through four portals of entry. The thyroid and thymus regions are divided in the median line. A horizontal line is drawn above the thyroid enlargement extending outward from the median line on each side. A second vertical line is then drawn downward and outward obliquely, beginning about two and a half inches to the outer side of the median line. Treatment is then given through the two central fields, directing the rays downward and inward, thereby obtaining some "cross-firing" effect on the deeper portions of the gland and the thymus. The patient is then placed in the prone position, face rotated toward the side being treated, and treatment is given through the posterior two fields, directing the rays downward and inward. In this way the greatest amount of cross-firing effect will be obtained with the least effect on the skin. These four treatments are usually given in one day, and only in the exceptional case is it divided.

No increase in symptoms and no harmful effect has been noted by Pfahler following this treatment, though in two or three instances on record patients are supposed to have been made worse by the treatment. He believes that these instances are more likely coincidental exacerbations of the disease previously existing rather than that the rays have caused them to be made worse. Such opinion is also expressed by Fischer.

Means and Holmes have noted no increase in symptoms as a result of *x*-ray treatment. The cases which were made worse or died also belong to the severe type, in which such exacerbations and even death may occur rather suddenly no matter what form of treatment is used. Through each of the areas above described are given about 75 to 80 per cent of an erythema dose filtered through 6 mm. of aluminum and from a distance of 25 cm. The erythema dose is varied somewhat with the individual, but the factors making up this dose will vary considerably according to the installation, and therefore each operator should learn his erythema-dose value with his own installation, either measured biologically or by physical means.

The interval between the first and second courses of treatment is usually four weeks. In urgent cases the treatment may be repeated, he believes safely, in three weeks. After this it should not be repeated inside of four weeks, and as soon as the symptoms approach normal the interval should be gradually lengthened so as not to carry the effects too far. Generally after the third or fourth series he increases the interval to six- and then to eight-week intervals. Judgment must be used in this matter, and the symptoms of the patients and their habits must be kept carefully under control. As associated treatment it is first of importance to eliminate any focus of infection, and unless this is done the treatment may be very much

and unnecessarily prolonged. In fact, with some patients the results are not satisfactory until all such infection has been removed. The patient should be deprived of any simulants, and all physical or mental excitement avoided so far as possible. The administration of quinine-hydrobromide in 5-grain doses three times a day may be helpful. All other general medical treatment such as has been found successful by internists should be utilized.

Pfahler concludes that in the treatment of hyperthyroidism the best line of treatment will probably follow a conference between the internist, the radiologist, and the surgeon.

Good results may be expected in about two-thirds of the cases.

The results are at least equal to those from surgery.

If patients do not show definite improvement after three or four months, an operation should be seriously considered.

Two or three preliminary treatments should do no harm, with proper technique, and generally will render an operation more safe.

The author tries to avoid giving more than eight or ten treatments as described above, so as to avoid skin changes.

A basal metabolism test should be made at the beginning, and will serve as a control during or at the end of treatment.

Focal infection should be eliminated in all cases.

Skill in technique and good clinical judgment is necessary to obtain the best results.

Treatment of Acute Gonorrhea in the Male.

In the *Lancet* of June 14, 1924, ABRAHAM states that gonorrhea in the male has an incubation period of three to twenty-one days; the average is five, any time after ten is rare. The earliest symptom is a slight gumminess of the meatus, associated with a sense of chafing. This appears usually on the second day after contact, and, if a smear is then taken, gonococci are present. This is an important fact not generally known, most practitioners waiting until pus shows on the third to fifth day. The inflammation at this stage is still confined to the squamous epithelium of the fossa navicularis, where the gonococcus can lead only a precarious life. It has not yet spread to the columnar epithelium of the urethra proper, where the organism can speedily burrow between the cells, invade the racemose glands of Littre, and establish itself firmly. The importance of recognizing the gonococcus thus early, and before pus formation, is due to the fact that at this stage it is still possible occasionally to abort an attack.

The most successful method of abortive treatment is that of Ballenger. After the patient has urinated, the glans and meatus are cleaned with spirit, and 20 minims of one-per-cent protargol, or 1:2000 collosol silver, is instilled into the anterior urethra with an ordinary hypodermic syringe. The lips of the meatus are then closed, and sealed with a strand of cotton-wool soaked in collodion flexile. The penis is then held erect until the seal has dried. After three hours this seal is removed with acetone, the patient meanwhile having been instructed to drink 1½ liters of Contrexeville or barley water. The same maneuvers are repeated six hours later, and, if pus formation has not started, continued on the two succeeding days. The method probably acts by increasing osmosis. Its success can scarcely be due to the strength of the gonococcicide used. In private practice a small proportion of first-attack cases can be aborted in this way, and it is therefore worth the attempt, particularly in married patients. In hospital cases it seldom succeeds. Carelessly used it aggravates the attack, especially in relapse cases. The points to remember are: (1) Not to use more than 20 minims—the normal capacity of the urethra. (2) Not to use silver nitrate, as is often done—it is a dangerous drug to seal up. (3) Never to attempt the method if pus is actually present—damming up the discharge in this way only aggravates the condition.

When definite pus develops, the patient should be given a saline purge and the bowels regulated throughout the attack. This appreciably diminishes the chance of posterior spread. A suspensory bandage should be worn, and the penis carried in a bag containing medicated cotton-wool to catch the discharge. Riding, cycling, dancing should be interdicted, all alcohol prohibited, spicy foods and coffee deleted from the diet. Urinary antiseptics are of no value in the acute stage of the disease. Sodium bicarbonate, gr. xx, quartis horis, to reduce acidity, may be required if micturition is painful. Bromides by the mouth and suppositories of atropine, gr. 1/75, should be prescribed if painful erections occur.

The purulent discharge is attacked in three ways: (1) by chemotherapy, (2) by vaccines, (3) by irrigations.

As to chemotherapy, the drug *par excellence* is manganese butyrate. It should be given by intramuscular injection into the buttocks on the first and fifth day of the discharge, in doses of 1.0 cc and 1.5 cc of a one-per-cent solution. Extremely gratifying results follow its use, the acute stage of the disease being materially lessened. Only two injections should be given—a third aggravates the condition.

Vaccines are of great value in the acute stage of the disease, and in Abraham's experience clinical evidence is overwhelmingly in favor of vaccines of the non-toxic variety. The Lock Hospital vaccine is prepared in a strength of ten thousand million to the cubic centimeter. It can be given every five days. The initial dose is 0.25 cc, increasing to 0.5, 0.75, 1.0 cc, and continuing at 1.0 cc whilst required. A negative phase does not appear to be produced, and complications such as epididymitis are rarely seen if this form of therapy is used.

Irrigation plays an important, but subsidiary, part in the treatment of the disease. If the urethra were a simple tube without glands it would be an easy matter to devise some wash-out method which would speedily cure the condition. Unfortunately nature does not work in this way, and, by the time the discharge is in evidence, the gonococcus has already penerated below the surface of the mucous membrane, invaded the glands of Littre, and entrenched itself well beyond the reach of any antiseptic that the urethra will tolerate in a strength sufficient to penetrate. Failure to recognize this fact, and persistence in using irrigation to the point of irritation, is responsible for many of the prolonged cases of urethral discharge which are so common in every clinic to-day. Irrigation should be used mainly for the mechanical purpose of washing out accumulations of pus. It is the increase in antibodies produced by the natural reaction of the body, and augmented by the use of vaccines, which causes the condition to clear up. Many drugs have been used for the purposes of irrigation. Practical experience speedily reduces the list to some five or six. These include: permanganate of potash 1/8000 to 1/4000, zinc permanganate 1/8000 to 1/4000, oxycyanide of mercury 1/6000 to 1/3000, acriflavine 1/4000 to 1/2000, silver nitrate 1/12000 to 1/6000. Each of the drugs enumerated has certain advantages. Permanganate of potash is the more generally useful. Zinc permanganate is valuable when an astringent action is required in the resolving stages, when the mucus output of the glands of Littre needs checking. Oxycyanide of mercury is valuable when the urine becomes clear with threads, in mild recurrences, and in cases in which secondary organisms are more prominent than the gonococcus in the discharge. It should never be used if the patient is taking iodide of potash by the mouth, as intense strangury is caused by the combination in the urine. Acriflavine is very useful in early cases when the urethra is particularly irritable and permanganate of potash cannot be tolerated. It tends, however, to make the mucous membrane very sodden, and should therefore be alternated with zinc permanganate every three days.

Indeed, it is a useful practice to ring the changes on whatever drugs are being used. Silver nitrate has its chief value in the later stages when a posterior urethritis is clearing up too slowly.

All irrigations should be given at least once a day at first, and then at gradually increasing intervals as the urine clears up. The temperature of the lotion should be 105° F., and the height of the irrigator about two feet above the patient's urethra. Two liters is the usual amount required. A syringe should not be recommended unless irrigation is impracticable. If it must be used, it is required three or four times a day, should be given in the erect posture, and the greatest possible care taken not to force the sphincter.

The question whether the anterior urethra only should be washed out at first, or the bladder irrigated right from the start, is still a disputed one. Logical treatment suggests anterior irrigation only for the first week, and if no signs of posterior implication then show, the continuance of this procedure. Sixty per cent of cases are said to develop posterior urethritis within the first three weeks. It certainly does not occur to that extent in the manganese-vaccine cases. Posterior urethritis is indicated in acute cases by frequency, precipitancy, pain, temperature, and usually a decrease in the discharge with some hematuria. Such a syndrome cannot be missed; but, unfortunately, in some 50 per cent of cases the patient complains of nothing more than a little frequency. It is for this reason that many competent urologists recommend bladder lavage from the start; and although he does not recommend this, he admits that in his experience there does not appear to be any extra risk involved in the procedure, provided that the anterior urethra has been thoroughly irrigated beforehand to get rid of all visible discharge. To irrigate the bladder the reservoir should be five feet above the urethra, and the patient instructed to urinate against the pressure of the incoming fluid. With a little practice it will then be found that the sphincter can be taught to relax automatically.

Symptoms of acute posterior urethritis should be treated, if possible, in bed; irrigations stopped, hot sitz baths prescribed, and the urine rendered alkaline with sodium bicarbonate, gr. xx, quartis horis. Suppositories of atropine gr. 1/75 should be given to prevent extension to the epididymis. Only after the condition becomes quiescent should irrigation be resumed. When discharge is lessening down the prostate should be examined per rectum; but massage is not indicated in the inflammatory stage. If the prostate is painful and a little swollen to the touch, manganese butyrate, if not already given, should be tried in a dosage of 1 cc intramuscularly. If, unfortunately, abscess development occurs, it is bad practice to pass a sound in the hope of rupturing it into the posterior urethra—an intractable posterior urethritis generally follows. If it is found pointing toward the rectum, resist the temptation to incise—you will only add a coli infection to the already existing gonococcal one, and may also establish a fistula. The correct procedure is to make a transverse incision in the perineum and drain. Epididymitis quickly resolves under intramuscular injections of contramine 0.25 g., and 10-per-cent guaiacol ointment locally.

Whilst under treatment the urine should be inspected at every visit to gauge the progress of the case. The simplest routine method is Thompson's two-glass test. In this the patient passes his urine into two glasses, one or both of which will show pus whilst discharge is present. As long as the second glass is clear the posterior urethra is probably not involved.

When both are clear, with or without threads, the acute stage is over. It is when this stage has been reached, and not till then, that intra-urethral instrumentation is permissible. Diagnostic bougies, sounds, dilators, the urethroscope, are all contraindicated as long as the urine is muddy with pus or muco-pus. Enormous harm

has been done in recent years by over-instrumentation, and invaluable instruments such as the urethroscope discredited in consequence.

No standard of cure in the male is complete that does not include a complete endoscopic examination of the urethra, the passage of a full-sized sound, and the microscopic and cultural examination of the urine before and after prostatic massage on several occasions spread over some months. A large proportion of so-called second and third attacks are merely relapses from a first attack of gonorrhea that has never been adequately treated because never properly examined for cure.

The Treatment of Severe Gastric and Duodenal Hemorrhage.

In the *Proceedings of the Royal Society of Medicine* for June, 1924, PATERSON states that it cannot be emphasized too strongly that patients rarely die of a first hemorrhage; it is the repetition of the hemorrhage which is of such serious import. Let us beware of the specious but fallacious argument which has been put forward in connection with these cases: "This patient is bleeding. He will probably die. Something must be done." Even admitting that the premises are true, he sees no logical or other reason for the conclusion that, because death is impending, something should be done which will probably make the patient's life shorter still. The case is quite different in acute intestinal obstruction, in which without surgical intervention death is inevitable, and so operation is justifiable even in desperate cases. In hematemesis, on the other hand, operation may be the last straw for a patient who otherwise might recover.

As regards the medical treatment of acute hematemesis, the important points are:

Rest in bed; and by this he does not mean what often passes as rest. The patient should be kept *absolutely* still in bed, no movement even of the arms or legs being permitted, and should be fed by hand with a minimum of disturbance.

Tripier's hot-water injections by the rectum, saline at a temperature of from 120° F to 130° F. being used.

An ice pack to the abdomen.

Nothing should be given by the mouth for at least four days, and then feeding should be commenced with teaspoonfuls of iced milk and egg (Lenhartz). This amount is gradually increased and the patient is kept on milk diet for two months, when some diluted beef essence may be added to the dietary.

In his experience it is not safe to commence Lenhartz's diet directly after a hemorrhage; sometimes he has seen recurrence apparently brought on by too early feeding. Saline injections, with half an ounce of glucose to the pint, are commenced soon after the hemorrhage has ceased. So-called rectal feeding is starvation except so far as fluids and salts are concerned, so that injections of beef-tea, milk and the like are valueless.

Small doses of morphine are valuable, although some clinicians object to the use of morphine on the ground that its use may prevent contraction of a bleeding artery. He believes this objection to be academic rather than practical.

The subcutaneous injection of a 10-per-cent solution of sterile gelatin in 40-cc doses may be repeated daily.

If vomiting or hematemesis continue the stomach should be washed out very gently with warm water, and after the lavage a dose of crystalline bismuth subnitrate should be given through the tube.

It used to be taught that in hemorrhage from the so-called acute ulcer, subsequent operation is unnecessary unless the bleeding recur. If we could be certain that the ulcer which bleeds is an acute ulcer this teaching would be sound, but as we cannot make such a pathological distinction the only safe rule is that an acute hemorrhage requires surgical treatment to prevent recurrence. As to the time of the operation,

the interval between the hemorrhage and operation should be at least three months, and if the patient is still anemic transfusion of blood before operation is a valuable adjuvant.

As regards the treatment of the chronic or recurrent hemorrhages, operation should, as a rule, be deferred for two or three months after the last hemorrhage according to the condition of the patient, medical treatment being carried out in the meantime—rest in bed, Lenhartz's diet, saline and glucose injections by the rectum, and gastric lavage. It must be borne in mind that in large excavating ulcers septic processes in the ulcer may play a considerable part in causing the hemorrhage, so that it is important not only to rest the stomach but to keep it clean. Usually these measures can be relied on to prevent recurrence, but even if the hemorrhage be repeated he would persevere with medical treatment. If in spite of absolute rest there is further recurrence, the question of operation may be considered, but—and this is the important point—absolute rest must have been tried and have failed. Although personally Paterson has never had to depart from his usual practice of delaying operation for two or three months, if in spite of a thorough trial of medical treatment there were many small losses of blood or more than one hemorrhage of such severity as to cause obvious anemia, he would not hesitate to operate before the onset of another attack. His experience is that efficient medical treatment does not fail. If, however, operation be decided upon it should be preceded by blood transfusion.

The Treatment of Acute Gonorrhea in the Female.

In the *Lancet* of June 21, 1924, ABRAHAM states that inflammation of Bartholin's gland and duct is generally gonococcal. It is unilateral in 60 per cent of cases. If the duct is inflamed, the orifice on the inner surface of the labium minus, opposite the vestibule, will show as a yellow punctum surrounded by an almond-shaped inflamed area—the "gonococcal macule." The gland is not palpable in health. If it can be felt in the lower third of the labium majus it may be assumed to be enlarged. The condition is usually associated with a vulvitis, and in the early stages can be aborted readily by two injections of 1 cc manganese butyrate (1 per cent) given, at five days' interval, intramuscularly into alternate buttocks. This drug acts like a charm in the primary inflammatory stage; the vulva clears up, the small central abscess comes to the surface and discharges, the septic condition quickly subsides. If, however, there is already an abscess the size of a walnut, associated with a much swollen labium, the ideal treatment is a T-shaped incision, complete removal of the gland, and gauze packing of the cavity to insure healing from the bottom.

Urethritis is present in 80 per cent of cases, but the subjective symptoms are often so mild that only about 5 per cent of women give a history of pain and frequency. Attention, therefore, is often concentrated on the cervix alone, with the result that when this is cured, the patient is often pronounced free whilst still dangerously contagious. When urethritis is present, examination will show pus (either directly or after massaging the urethra from the vagina) or inflammatory thickening, induration, or pain on pressure. In addition, the presence of the gonococcus can often be demonstrated in the paraurethral or suburethral crypts. Skene's ducts, two small cul-de-sacs opening on either side or just inside the urethra, are constant sites of infection. Treatment consists in irrigating the urethra with permanganate of potash, 1:10,000, by means of a two-way cannula; or, instead, one may use a female urethral syringe with a fenestrated nozzle, and inject 1-per-cent protargol in glycerin daily in acute cases, or 10-per-cent protargol in glycerin weekly in chronic cases. As a rule, the female urethra is very tolerant of topical treatment; but occasionally, especially if acute cystitis is present, local treatment cannot be carried out, and then one has to rely on medicated

sitz-baths and alkaline treatment for the cystitis. There are a few Littre's glands in the female urethra, and soft infiltrations and suburethral abscesses form occasionally, with subsequent risk of stricture. For these, massage from the vagina on a straight metal sound—22, 24, 26 French—followed by irrigation, is the treatment indicated. Skene's ducts, and any paraurethral cryps infected, should be obliterated by probes tipped with fused silver nitrate or the thermocautery.

Acute endocervicitis is, of course, the cardinal lesion in the adult female. It is also the most difficult to cure; for here we are dealing with a columnar epithelium having many crypts, pouring out an alkaline secretion—in every way the most favorable possible nidus for the gonococcus. The main symptom is a profuse, persistent "vaginal discharge." The carunculæ myrtiformes are generally inflamed, and so examination is painful or impossible in the very early stages. As soon, however, as a speculum can be passed it will be found that the vagina itself is little implicated, but that the cervix is enlarged and tender, the canal is friable, bleeds easily, and is pouring out a thickish yellow discharge over the somewhat eroded posterior lip of the os. Treatment consists in douching the vagina twice daily to remove the discharge, and treating the cervical canal with topical applications as soon as a speculum can be introduced without undue pain. Many combinations of drugs have been tried for this condition. The two methods described below have proved satisfactory.

The hypochlorous acid treatment consists in using any of the various chlorine preparations—*e.g.*, Dakin's fluid in the form of chloramine-T, or one of the hypertonic solutions of sodium hypochlorite now on the market—as a douche twice daily, and also as a topical application to the endocervix once a day. The strength of the douche is 1:1000 to 1:500. Douches only are used at first until it is possible to pass a speculum. As soon as this period arrives the instrument is inserted daily if possible —certainly not less than twice weekly—and the fornices and cervix swabbed clear, by means of wool on holders, of the veil of pus and mucus obscuring the field of operation. The cervical canal is next freed from discharge and mucus by Playfair probes tipped with cotton-wool, either dry or soaked in peroxide of hydrogen. When the canal is clear the chlorine solution in a strength of 10 per cent is similarly applied up to the internal os; and the vagina finally swabbed out with wool on a holder as the speculum is being withdrawn. At the same sitting any inflammatory foci around the urethral or vaginal orifices are also treated. Should there be frequency of micturition a bladder irrigation of 1:1000 is used. These manipulations, combined with a daily sitz-bath, will cause rapid improvement in about ten days; and one can then lengthen the time between topical treatments according to the symptoms. Another drug which can be used in the same manner and in the same strengths is acriflavine.

An equally successful method is the manganese-contramine treatment introduced by McDonagh. The patient is put to bed and an intramuscular injection of 1 cc manganese butyrate is given, followed by a 1.5 cc injection on the fifth day. This drug reduces the acutely painful stage of profuse discharge to a few days; and douches of potassium permanganate, 1:4000, are then given for the next three or four days. The patient is then started on a course of 30 contramine pessaries. These are inserted nightly against the cervix, and held in position by a gauze tampon. The tampon is removed in the morning, when another permanganate douche is given. At the end of the course smears are taken, and if still positive the contramine is repeated. Markedly good results have been obtained by this treatment. For subacute cases, when the patient is seen for the first time after the condition has lasted some months, it will be found that 10-per-cent protargol in glycerin, twice weekly, is an excellent topical application. Each treatment by this drug should be completed by inserting a gauze tampon, soaked in the same medica-

ment, packed round the cervix. There it remains for twelve hours, when it is withdrawn by means of its string, and a douche of 1-per-cent lactic acid given. Normally the vagina is acid, its acidity being due probably to the *Bacillus acidi lactici.* The strength of the acidity is 0.9 per cent, and this is inimical to most bacteria. Lactic acid in 1-per-cent solution is therefore recommended as a vaginal douche in all chronic conditions because it is the nearest approach to nature's method.

Douching was at one time the only treatment used in combating this disease; and it is still too frequently relied upon in general practice. Many of the drugs used were not only physiologically unsound, but positively detrimental. The so-called mucous membrane of the vagina is not a real mucous membrane. It is a modified skin with a surface composed of squamous epithelium. There are no glands in it, and it is therefore extremely resistant to organisms. Substances like corrosive sublimate, silver nitrate, picric acid, alum, zinc, any of the coal-tar preparations which precipitate albumin, largely destroy the normal protective mechanism by producing a desquamation of the surface epithelium, thus allowing the gonococcus to penetrate much more easily than it otherwise could. A great deal of the "granular vaginitis," which used to be so common years ago, was undoubtedly due to the overuse of powerful caustic douches such as corrosive sublimate; and the reason why we do not see this condition anything like so frequently to-day is because a much more sensible view is now taken of the value of antiseptics as curative agents in themselves.

In gonococcal disease the practice of douching with these powerful antiseptics originated from the erroneous assumption that the vagina was infected with the gonococcus, and that any cervical discharge also present could be cured by the vaginal douches used. It is unfortunate from the standpoint of rational treatment that the mucous membrane of the vagina is comparatively insensitive, and so these caustics can be used with impunity—caustics which simply erode away the normal protective layers of the epithelium and so allow infective organisms to penetrate. Powerful antiseptics are not required in the vagina; they do not affect the cervix. Primary gonococcal vaginitis, except in children and in extreme old age, is very rare. Douching the vagina, therefore, should be largely for the mechanical purpose of getting rid of discharge; and a mild acid preparation, such as 1-per-cent lactic, or boric, or any of the preparations such as Dakin's fluid, which does not precipitate albumin, should be used, unless, of course, an infective vaginitis is present.

Eclampsia: Its Treatment.

In *American Medicine* for June, 1924, RUBEL says that prevention being the ideal treatment outlined for any disease, what should be more natural than to apply the same measures to eclampsia which will without a doubt reduce the mortality from this dread disease to a figure many, many points below its present high rate. Therefore the prophylactic treatment is discussed first, because the prevalence of eclampsia is in inverse proportion to the care and intelligence bestowed upon the living habits of the pregnant woman, for convulsions due to toxemia are almost entirely preventable by the observance of certain rules during pregnancy.

The patient should report to the office for regular and frequent urinary examinations, blood-pressure readings, weighings, and ophthalmoscopic inspections, together with general and special physical examinations when symptoms warrant. The diet should be regulated, and Rubel is especially careful in reducing to the minimum the intake of meats, eggs, cheese, and beans, and, toward the termination of pregnancy, prohibiting them entirely. Fluids are given freely—water, milk, or buttermilk. Sufficient sleep should be obtained and proper elimination secured through the intestinal tract, urinary apparatus, and skin. The

teeth should be inspected and attention given them when necessary; likewise the tonsils and sinuses should receive appropriate examination and treatment when conditions demand.

Occasionally in spite of the most watchful care, toward the latter part of pregnancy, there will be noted a rise in blood-pressure, a trace of albumin in the urine with an occasional cast, and some evidence of restlessness. Rubel does not believe that eclampsia is always a preventable affection, but is convinced that prophylactic treatment has been of inestimable value in reducing the inordinately high mortality rate. In some cases, despite all we can do, eclampsia will occur, but happily these cases are few and far between.

The curative treatment may naturally be divided into two methods: (*a*) Radical or surgical, and (*b*) medical or conservative.

The conservative treatment as now practiced in some of our larger maternity centers shows a decided improvement in mortality statistics when compared with results obtained by radical or operative measures.

In the first place, all patients with eclampsia should be hospitalized, as the facilities in a properly organized hospital are vastly superior to those in the most well-appointed home. Place the patient in a quiet, darkened room, preferably an isolation room, and as much quietude as possible should be obtained. A thoroughly competent nurse should be in attendance and should not leave the patient alone until she has definitely emerged from coma. One-quarter grain of morphine is administered hypodermically. If comatose, the patient should be turned on one side and the foot of the bed elevated. The head should be placed over the side of the bed to permit ready escape of mucus, food, etc., from the mouth. A second dose of morphine may be administered when required, but not more than one-half grain should be given during the first twenty-four hours. Gastric lavage is now practiced, using a five-per-cent solution of sodium bicarbonate until the fluid returns clear, and during the introduction of the last pint, two ounces of magnesium sulphate solution or two ounces of castor oil should be included. A colonic irrigation is given, using five gallons of five-per-cent sodium bicarbonate solution. Some obstetricians, notably Baughman, advocate digitalis in some form until the patient is thoroughly digitalized as a safeguard against cardiac failure and pulmonary edema. If the blood-pressure is over 175 mm. Hg, systolic, venesection is indicated, a sufficient amount of blood being withdrawn to reduce the pressure to 150 mm. The amount of blood will vary from 200 cc to 1000 cc, depending upon the pressure. A complete chemical blood analysis should now be made, not forgetting the presence of sugar. Introduce through the same needle an equal amount of a 20- to 25-per-cent sterile glucose solution, freshly prepared, to balance the amount of blood withdrawn by venesection.

If convulsions have ceased and the patient is in labor, delivery may occur normally or may be expedited by an easy low forceps application. Ether is administered to control convulsions while waiting for the effect of morphine. Gas-oxygen anesthesia is used when actual delivery occurs.

If convulsions are increasing in number and severity, with coma during the intervals, and if the lungs are becoming edematous, deliver in any way that will cause the least shock to the mother. Food is withheld until three or four days have elapsed, and then a little skimmed milk is allowed. Water or lemonade may be given at first in moderate quantities.

Treatment of Migraine.

In the *British Medical Journal* of June 21, 1924, GREIG states that it is possible that in some individuals the cause is gastric dilatation, owing to muscular weakness, either inherited or acquired. Accepting this as a possibility, the following scheme was drawn up for patients suffering from migraine, the endeavor being to maintain the stomach so far as possible in

its normal physiological condition. The results have been most satisfactory. While patients are willing to submit to this routine they get no attacks of migraine and no sick-headaches. The scheme is as follows:

I. Diet. Exclude rigidly: (1) Cakes, scones, biscuits, pastry. (2) Steamed puddings, sponge puddings, trifles. (3) Green vegetables, including peas and beans. (4) Aerated drinks, including whisky and soda, and champagne; effervescent purges.

Allow any of the following:

Breakfast—Porridge, fish, eggs, bacon, chops, bread-and-butter or toast, marmalade, jam, tea, or coffee.

Luncheon—Soup, fish, meat (of all kinds), potatoes, marrow, pumpkin, tomatoes, milk puddings, custards, junket, stewed fruits, baked apples, fresh fruit.

Afternoon Tea—Bread-and-butter, toast and butter, sandwiches, tea or coffee.

Dinner—Soup, fish, meat, poultry, potatoes, marrow, pumpkin, tomatoes, custards, jellies, fruit salads, ice cream, fresh fruit, coffee.

II. Medicine. During the first two weeks of treatment the following mixture is to be given three times a day, half an hour after meals, and then discontinued altogether.

℞ Acid. hydrochlor. dil., mins. v to x;
Glycerin, mins. x;
Aqua, ad f℥ ss.

As an aperient, cascara evacuant (P. D. & Co.) ½ to 1 drachm, water to ½ oz., should be given at night-time when required, but not as a routine.

III. Posture. The patient must sleep without a pillow, so that the head, neck, shoulders, trunk and limbs are all on one level. Patients very quickly become accustomed to this position.

IV. Exercise in the open air and gradually increasing in amount. Walking is probably one of the best exercises and is available for all, whatever the condition or circumstances of the patient.

This method at least has this advantage, that it makes it possible to eliminate those cases of migraine which are due to dilatation of the stomach. It leaves, in her experience, very few cases for any other form of treatment. How long it will be necessary for those subject to migraine to continue this routine she cannot say. While continuing the routine every effort should be made by means of tonics, good food, fresh air, but above all by exercise, to build the patient up physically.

It is probable that, with increased knowledge of the mechanism of the stomach muscle, we will understand more clearly the pathology of migraine, and understand better also how to maintain the stomach muscle in that stage of contraction which is its physiological normal.

The Antibacterial Power of Egg-white.

Writing in the *Lancet* of June 28, 1924, FLEMING and ALLISON state that egg-white contains a bacteriolytic, bactericidal, and bacterio-inhibitory substance. On a susceptible bacterium the lytic power is still manifest when the egg-white is diluted 50,000,000 times. The bacteriolytic power of egg-white from different species of birds varies considerably when tested to the same microbe. The egg-yolk has a very slight antibacterial action on a susceptible organism, but when tested to a less susceptible microbe it has apparently no antibactericidal power, and to some extent inhibits the bactericidal action of the egg-white. Egg-white inhibits the growth of most of the pathogenic bacteria tested, and has a definite lethal or lytic effect on many of these bacteria, *e.g.*, staphylococcus, streptococcus, meningococcus, B. typhosus, B. anthracis, etc. The lysozyme of egg-white resists peptic and tryptic digestion, and following the ingestion of raw egg-white by the mouth the number of streptococci in the feces was temporarily much reduced. Egg-white added to blood *in vitro* maintains its antibacterial action, and when injected intravenously into an animal it confers on the blood serum of the animal marked antibacterial powers which are still evident after several hours.

The Action of Quinine on Protein Metabolism, Respiratory Exchange, and Heat Function in Fever.

In the *British Medical Journal* of June 28, 1924, HARDIKAR states that a mere lowering of the temperature is not enough to attain our object unless it is due to a lowered production of heat in the body. If the temperature falls from increased loss of heat only, there can be no corresponding economy of the energy reserve, although some saving doubtless occurs. Antipyresis is to be attained through (*a*) the use of cold or tepid water baths, or (*b*) the antipyretic drugs like antipyrin, salicylates, and quinine. Water baths abstract heat from the body directly, and as the heat-regulating mechanism is still active in fever, it responds by increasing the heat production, so that although the temperature is reduced the energy expenditure of the patient is not reduced in a corresponding degree.

The antipyretic drugs, with the exception of quinine, have also been shown to reduce the temperature by increasing heat loss, and the tissue destruction was not materially lessened and sometimes was increased by their use. In the case of quinine, on the other hand, no unanimity of opinion has been attained, but the prevailing view is that it diminishes the protein metabolism and lowers the excretion of nitrogen, so that it effects a saving in the nitrogenous tissue waste. Protein destruction is ordinarily understood to imply the oxidation of the non-nitrogenous moiety of the molecule, and its reduction ought to show itself in a fall in the consumption of oxygen. But quinine is said not to affect materially the oxygen intake. In explanation of this conflicting behavior of the nitrogen metabolism and gas exchange the suggestion is made that oxidation is not the only source of heat, but that heat may be liberated by such changes as the cleavage of protein molecules, in the course of which urea is formed. According to one view, quinine hinders these changes and thus reduces the temperature. Its action, moreover, is supposed to be exerted directly upon the tissues and not through the intermediary of the nervous centers.

Quinine is used to a large extent in the treatment of fevers, even when not malarial in origin—in which it is recognized to act primarily against the causative agent—and if the above views could be firmly established by experimental results they would provide a strong argument in favor of such use; on the other hand, if they were found to be groundless, it would follow that quinine does not differ essentially from the other antipyretics, has no advantage over them in non-malarial disease, and is not capable of attaining the object aimed at—of reducing the energy expenditure of the patient. The question was therefore taken up as being one of considerable practical interest and of sufficient importance to justify a reëxamination of the available evidence and experimental study afresh where necessary.

Hardikar concludes that quinine does not differ in its mode of action from other antipyretic drugs.

It has no action on the protein metabolism in health.

It does not reduce the gaseous exchange and heat production except in a small proportion of fever cases, and even in these the action lasts for less than three hours with the maximum pharmacopœial doses.

It is not possible in non-malarial fevers to attain a saving of energy and tissue destruction through quinine.

Changing Standpoints in Cardiac Medicine.

In *The Practitioner* for June, 1924, SIR SYDNEY RUSSELL-WELLS states that in arteriosclerosis we have an increased resistance in the systemic arteries and arterioles, and it may be also in the capillaries; it is beside the point to discuss at the present moment how this is brought about, or the relation to it of granular kidney and excretory arrangements; he deals only with the mechanical effects, and it is sufficient for his purpose to point out that in arteriosclerosis and chronic interstitial nephritis there is a greatly increased systemic peripheral resistance. It matters not, so far as the left ventricle is concerned,

whether the increased resistance is in the peripheral circulation or is due to aortic stenosis; more work is called for, a greater amount of energy has to be generated, if the circulation is to be efficiently carried on. There is this difference, however, that in aortic stenosis the tendency is to diminish the output into the systemic arteries, while in arteriosclerosis the output remains normal; therefore, to provide the increased energy required the mean pressure must rise.

Speaking generally, we may say that when there is an obstruction in any part of the circulatory system the pressure tends to rise on the cardiac side of the obstruction, and the output tends to fall on the peripheral side.

Starling has shown that the way the ventricles respond to a call for increased energy is by dilating, the force with which the individual muscle fiber contracts being directly proportional to its length. As the healthy heart muscle can, on emergency, contract with something like ten times its usual force, one can understand how greatly increased blood-pressure can be maintained over long periods. Therefore, in arteriosclerosis, on account of the demand for increased energy to overcome the raised resistance in the systemic arterioles, the left ventricle dilates and hypertrophies, the systemic arterial pressure being set, as it were, at a higher normal; the output of blood remains normal, the extra energy being used up in overcoming the resistance in the arterioles, the rate of flow through the systemic capillaries being thus kept normal, as is the flow through the pulmonary arteries and the capillaries of the lungs, so neither edema, dyspnea, nor cyanosis occurs. It may even be that in some cases the output is slightly increased, and so the whole circulation is quickened; the concomitant enlargement of the right ventricle seen in many cases of arteriosclerosis points in this direction. The higher systemic arterial pressure results in the systemic arteries being more distended than normal, so that while in mitral stenosis there is a shifting of the mass of the blood on to the venous side, in arteriosclerosis there is a tendency for the blood to accumulate on the arterial side of the systemic circulation. So long as the left ventricular muscle can continue to generate the increased amount of energy required, the circulation is efficiently maintained, but a continued high blood-pressure entails changes in the arterial walls, and the vessels of the heart itself are not exempt from these changes, so ultimately the nutrition of the dilated and hypertrophied left ventricle is impaired. Moreover, whatever is the fundamental cause of the arteriosclerosis it has a tendency to be progressive, and an ever-increasing demand for energy is made upon the heart; ultimately the ventricular muscle becomes unable to supply the high quantum of energy required, either because the demand has risen too high, or in most cases more probably because its nutrition for some reason is beginning to be impaired. Frequently a toxemia due to an intercurrent infection or some period of extra exertion with an increase of waste products in excess of the rate of elimination, or the like, is the last straw that determines the moment of the failure signalized by a fall of systemic blood-pressure.

While the output is normal, or possibly even more than normal, the moment that the fall of pressure occurs, the fact that the total energy available to force the blood past the peripheral obstructions is diminished, soon results in less blood getting through to the veins; hence a diminished filling of the right auricle, a lessened output of the right ventricle, and less blood for the left ventricle to deal with. This may for a short period relieve the tired and overworked left ventricle, but the result of the diminished left ventricular output is a slowing of the systemic capillary circulation, which produces all the signs and symptoms, such as swelling of the liver, edema, and ascites.

There is one interesting condition, acute edema of the lungs, which sometimes occurs in arteriosclerosis, and the closely associated condition of interstitial nephritis,

which he believes is due to the sudden failure of the left ventricle to maintain the requisite high systemic blood-pressure. As he has pointed out, in arteriosclerosis the distended arterial system contains more than its normal quantity of blood; when the pressure suddenly falls the elastic recoil of the arteries forces this excess into the veins, which become engorged with blood. The right auricle suddenly receiving much more than its usual supply of blood, the right ventricle at once pumps it into the lungs; the enfeebled left ventricle cannot immediately deal with this excess, and acute engorgement of the lungs ensues. As in some measure confirming this idea, he has seen in cases of acute edema of the lungs results which appeared little short of miraculous, following a large bleeding by venesection and the simultaneous hypodermic injection of morphine and atropine.

Observations on the Modern Treatment of Lung Suppuration.

In the *Weekly Roster and Medical Digest* of Philadelphia of June 14, 1924, CHEVALIER JACKSON states that the modern attitude toward lung suppuration requires that the internist, surgeon, roentgenologist, pathologist and bronchoscopist, and often the anatomist, converge on the problem and on the individual case. Coöperation is necessary for the best interests of the patient. Malignant disease is the cause most frequently overlooked in lung suppuration, and is seldom if ever diagnosticated in its incipiency. An exploratory operation in the absence of a diagnosis, which frequently reveals an early malignancy in the abdomen, is not so readily resorted to in the lung. A diagnostic bronchoscopy is invaluable for revealing pulmonary malignancy early enough for surgical cure.

A case was brought to the Jefferson Hospital, a young woman, aged twenty-four years, almost exsanguinated after repeated hemorrhages, which she had been having over a period of three years, during which time she had been treated for pulmonary tuberculosis. There was excessive bleeding at the menstrual period. Drs. McCrae and Funk questioned the tuberculous diagnosis, and Dr. Manges diagnosticated it from the *x*-ray as a possible malignancy. On bronchoscopic examination there was found below the middle lobe bronchus an area showing infiltration and deformity, with free bleeding. It was diagnosticated malignancy, and a specimen taken at that time proved to be adenocarcinoma. The growth had at first been endobronchial and confined to a single lobe, and an early diagnosis with lobectomy would have meant cure. Dr. Gibbon decided the condition inoperable. A pneumonograph was done, with insufflation of bismuth subnitrate, which stopped the bleeding. After a transfusion and a course of *x*-ray treatments she is now temporarily in fair health, her extreme condition having been due to hemorrhage, not cachexia.

The bronchoscope is to thoracic surgery as the cystoscope is to renal surgery. By it the source of pus and blood can be determined. Just as the genito-urinary surgeon assigns certain cases for cystoscopic treatment, so the thoracic surgeon finds some cases which are best treated by the bronchoscope. Bronchoscopic aspiration is advisable in any case in which the surgeon thinks that an external operation should be postponed, or where the internist is getting some results without retrogression but with no gain, when drainage through the bronchoscope may turn the tide. There are two defensive mechanisms of the lung: germicidal and germifugal. The germifugal elements are the cough and the cilia. When the pus is foul there must have been stagnation, with the cilia overcome, with granulations causing obstruction and a gap in the cilia. The granulations can be removed bronchoscopically and the cilia restored to function by bronchoscopic aspiration. The erect posture occurs late, phylogenetically, and fosters bad drainage.

Jackson by means of slides has shown the work done in bronchoscopy as an adjunct

to medicine and surgery. Several of these revealed projectiles, localized by *x*-ray and pneumonograph, and removed by the bronchoscope or operation. Several demonstrated bronchiectatic bronchi, and in one of these the bronchoscope had been introduced by Clerf and a cautery directed against it from the chest wall by Shallow, to establish a bronchocutaneous fistula. Other slides showed abscesses or cavities with fluid levels, subsequently drained through the bronchoscope and cured. No patient has ever been killed with the bronchoscope, although there is always the possibility that the hemorrhage which occurs so frequently in these cases might coincidentally happen at the time of, or after, the bronchoscopic examination. General anesthesia is never used; local anesthesia may be used for adults, none is necessary for children.

Lilienthal, of New York, in considering the "Surgical Aspect," paid tribute to Dr. Jackson's inimitable presentation of his subject and said that in his opinion all cases of lung suppuration or suspicious lung tumor should come first to the bronchoscopist. He cited one case which he had not had bronchoscoped, a woman who ten or twelve days after tonsillectomy began to cough and spit out foul matter. The site was so clearly shown by *x*-ray that operation was done at once. The patient died, and autopsy revealed a two-inch piece of bone in the middle lobe bronchus, which probably had caused the cough for which the tonsillectomy was originally done. Tumor in the lung is frequently not operated until late because of fear of the operation, yet cancer in the lung becomes inoperable much sooner than does cancer of the breast because of lung suppuration. There are two kinds of lung cancer, that which starts in the bronchus at the second bifurcation, enlarges and interferes with drainage, and that which starts in the parenchyma, irritates by pressure, and is clearly visible by *x*-ray. Cancer of the lung is not in itself particularly malignant or metastatic; death is due to the secondary breakdown. Early diagnosis is possible in the first type by the bronchoscope, in the second by *x*-ray, and he has lost no case in which removal of carcinoma of the lung was done. Abscesses of the lung may arise from secondary interference with drainage by a foreign body (septic or aseptic), by a break-down of a pneumonia process, or by an embolus. The emboli are carried in the blood stream, and usually multiple abscesses form in the lung and the case is fairly hopeless. There may be a limitation to one part, with a resulting indurative pneumonia. The diagnosis of the inhalation type is not difficult, because of the history of operation of foreign body, but in the parenchymatous type diagnosis is difficult, and should be made before there is rupture into a bronchus; since the patient is unable to cough out all the material an operation is necessary, and healing is much slower with a two-way opening.

Lung abscess is not a disease of physical signs, but of symptoms: fetor at the mouth, and, late, expectoration. If the abscess is of the bronchiectatic type, bronchoscopy should always be tried; if unsuccessful, operation; although resection of the lobe of the lung shows 50 per cent mortality. If both lungs are infected, a main or secondary bronchus should be drained. Removal of part of the lung with soldering iron has been done, but Lilienthal has not used this method because of danger of hemorrhages. During the operation there is danger of an air bubble causing a cerebral embolism, and bacterial embolism may occur with or without operation; these abscesses are always multiple and fatal. A study of lung abscess made at Bellevue Hospital, New York, covering the years 1918 to 1922, showed that of 169 cases 40 per cent died and the remainder were discharged unimproved. Certainly this is a plea for surgery. Drainage or lobectomy has been done in some cases.

Tucker has shown films taken at the bronchoscopic clinic, demonstrating bronchoscopy, aspiration, irrigation and treatment, and postural (coughless) drainage.

The Administration of Digitalis.

In *The Practitioner* for June, 1924, CHAPMAN insists that this most valuable drug should be prescribed with judgment. Before the discovery of auricular fibrillation it was recognized that this drug had a decided effect upon the irregular pulse characteristic of this condition, and that along with the slower and fuller pulse thus obtained other symptoms were relieved. This effect of digitalis is also seen in heart failure. The slowing of the pulse used to be considered by many to be due to a depressant effect of the drug, but this explanation was strongly contested by the late Sir Samuel Wilks, who contended that digitalis was a heart tonic. We know now more exactly the reason of its efficacy. A great deal has been written on the manner of obtaining the maximum effects of the drug in the shortest time; the current opinion is that a more rapid effect is gained by the prescription of half-drachm doses of the tincture every four to six hours until the physiological effect of the drug is seen; the dose is then toned down until a minimum is attained by which the improved condition of the pulse is maintained. "Guy's" pill, containing small doses of digitalis, grey powder, and squill, is a useful form for lengthened use.

Quinidine is a drug which has come much to the fore of late; its special value is in auricular fibrillation, especially when digitalis has failed. About 50 per cent of cases respond to this treatment; some observers give a higher percentage. The drug is contraindicated in moderately advanced fibrillation. *The Practitioner* of January, 1924, page 41, should be consulted.

Digitalis at times does all that is required as a diuretic, but other drugs are often needed. Compound jalap powder in scruple doses will assist in a "water-logged" case; theocine, sodium acetate, and caffeine are also valuable aids in suitable cases. Should puncture of the legs be necessary the patient should be as much in the chair as possible.

Strychnine has no direct effect on the heart muscle, its function being that of a general tonic.

No class of remedies has, in his experience, been more abused than vessel dilators, especially in neurotic patients when bromides and valerian are clearly indicated. An assurance that the heart is sound, when it can be given, is the best remedy. In angina pectoris these drugs are of undoubted value.

For sleeplessness care and judgment are indispensable in the prescription and choice of sedatives and narcotics. It would be impossible to discuss the relative merits of the numberless examples of these drugs now on the market; in Chapman's experience, chloral gr. 10 with bromide of ammonium gr. 10-20 is a reliable sedative. Cases do, however, occur when gr. 1/4 of morphine is the only remedy.

It must always be borne in mind that heart patients at all stages are particularly liable to various forms of indigestion, hence the importance of discretion in the choice of foods. In ambulatory cases where some solid food may be taken thorough mastication should be insisted upon. As little fluid as possible should be taken with the food, the requisite quantity being taken between meals. Rest on the couch for twenty minutes after each meal materially assists digestion. Farinaceous foods should be sparingly taken from their tendency to provoke flatulence. When it is difficult to get nourishment down from urgency of symptoms, whites of eggs in lemon barley-water is a useful way of giving support without the patient's knowledge. Above all avoid a set diet as far as possible so as to allow of surprises.

To be able to give reliable advice on the kind and nature of exercises presupposes an accurate diagnosis including an approximate estimate of the patient's reserve. No matter what lesion or lesions the patient has, it is the condition of the myocardium which matters. The safest plan is to feel one's way and carefully observe the effects on the pulse and respiration, noting the length of time required for a return to the preëxercise rate and character. Shortness of breath is nature's signal for calling a halt, and when walking the return journey must be kept in mind.

It will be noted that in heart disease, sooner or later, many other organs are liable to be temporarily or permanently involved, and that in the latter event pathological changes occur which react upon the heart and increase its difficulties. The discovery of a valve lesion is not the alpha and omega of our investigation; indeed, its immediate importance may be overshadowed by functional disabilities elsewhere. We thus come back to the paramount importance of a diagnosis founded on a thorough examination of the patient. Modern instruments of precision are valuable and, in some cases, indispensable aids to diagnosis, but they in no way make physical examination obsolete. Instances have come within Chapman's knowledge in which in consequence of undue reliance having been placed on a graphic record, *x*-ray examination, or a laboratory finding, serious error resulted.

Non-inflammatory Glaucoma—The Thief in the Night.

In *Minnesota Medicine* for July, 1924, LEWIS states that stealthily creeping in, without outward visible sign or warning, to rob us of our most treasured sense, is the picture in his mind's eye, ever to keep before him, that every practitioner of medicine should have of simple, non-inflammatory glaucoma, for no more tragic affliction is the lot of man. Generally, one might say most frequently, unrecognized until well advanced, the most precious time for its combatment is too often used up by the optometrist, and others untrained in ocular pathology and clinical ophthalmology, in repeated change of glasses—given with the opinion that the patient "is becoming farsighted" or that "it may be an oncoming cataract," etc. And finally, too late for help and after optic nerve atrophy is well on its way, the patient consults the oculist, whose sad and painful duty it becomes to say that nothing can be done, and the unfortunate person must drift into the long night of blindness.

"Early recognition means everything. Late recognition or wrong diagnosis means loss of everything" (Fuchs). Although primary glaucoma, according to Fuchs, constitutes one per cent of all eye diseases, how extremely infrequently the general practitioner recognizes it or even suspects it only the well-occupied oculist is conscious of, and this, too, in cases of the inflammatory form. Iritis and iridocyclitis, in the presence of an inflamed eye, seem almost always thought of, and that diagnosis is generally made in most cases even if the patient is fortunate enough to be spared the catastrophe of having atropine put in his eye. How much more rarely, then, the non-inflammatory form, without a single outward objective sign, is even suspected can well be imagined. Just such cases are the ones which, during the very time that something could be done for them to halt the dreadful malady, are glassed and reglassed by the optometrist and others without special training, only to lose steadily the remaining vision they possess.

These cases, too, as we all know and are sad in the realization, go undiagnosed through the hands of careless and superficially working oculists—the kind of refractionists who are satisfied with less than normal vision in their patients without finding the reason why; who pass over accommodative inability in their patient without the compatibility of age or hyperopia; who are in too much of a hurry to take the field of vision when it is indicated; and whose dark-room observation is less than a careful, thorough, and searching examination of the anterior segment of the eye by oblique illumination and loupe, and the posterior segment of the eye (including lens, media, peripheral retina, macula and nerve-head, its color, size, margins, elevation, cupping and vessels and their behavior) with the ophthalmoscope. Just such work has belittled scientific refraction, than which no branch of ophthalmology is capable of requiring more high training, good balance, and sound judgment; this type of man's refraction takes no longer to do than the optometrist's, and in reality is not worth any more, and is responsible now for the growth and prominence of the optometrist and his kind in our midst.

A fact all oculists must ever impress

upon themselves is that glaucomatous cupping with atrophy is too late for help. Cupping prior to atrophy is what we strive to find, and it is our business to recognize it.

Iridectomy for relief of glaucoma should always be done as early as possible by making section well into the sclera, rather than in the cornea, and should be as broad as possible and to the very root of the iris. Where regional atrophy exists in the iris, the iridectomy should be done in the least atrophic part, for in this region it will be more effective in opening the angle of the chamber. The various forms of sclerotomy, including trephining, have not proved as dependable as the broad iridectomy, and even in the simple non-inflammatory form the latter would, no doubt, be the most dependable if it could be done in early recognized cases. The action and benefits of myotics in the medical treatment, of course, are to be seen in the drawing away of the peripheral folds of the iris at the angle of the chamber such as takes place in active contraction of the iris. Eserine and pilocarpine can be efficacious only where the iris muscles are capable of contracting, surely not when atrophy of that structure makes such contraction impossible. The action of myotics should be welcomed only as a tide-over and not as a substitute for proper surgical relief, for when their effect wears off the tension is likely to return. The liberal use of myotics before operation is a great help. Tension may be partially relieved, anesthesia may be more effective, and the operation is rendered far easier in performance.

Surgical and Genito-Urinary Therapeutics

Puncture of the Cisterna Magna in Children.

KRAMER (*Ohio State Medical Journal,* May 1, 1924) thus describes the technique of cisterna puncture:

For the right-handed operator, the patient is placed in the left lateral position, just opposite to the position of choice in performing a lumbar puncture. An assistant flexes the head, and body, and then the thighs on the abdomen. The usual surgical skin preparation of the neck, shoulders and head is done. Local anesthetic, novocaine, may be injected in the site of puncture. The palm of the left hand is now placed over the upper occiput and parietal region, with fingers outstretched to hold the head steady and firm against the table. The thumb is placed so as to mark the upper edge of the recess between the external occipital protuberance and the spine of the axis.

With the right hand the ordinary lumbar puncture needle is now inserted in the midline just below the occipital protuberance as guided by the left thumb. The needle is directed in a line drawn over the external auditory canal and the glabella. It goes through the soft tissues very easily until it arrives at the occipitoatlantoid ligament, which extends from the posterior border of the foramen magnum to the atlas. Here great resistance is encountered. Firm easy pressure is now applied to the needle as it traverses the ligament, which pressure must be released immediately when the sensation of sudden loss of resistance or "give" is encountered. This designates that the needle has gone through the ligament and, as the dura is attached to the anterior surface of the ligament, its point must be in the cisterna magna.

The distance from dura to medulla in the adult is 1.5 cm., but since the direction of the needle is upward a greater distance is possible (2.5 to 3 cm.) before damage can be done.

Wegeforth, Ayer and Esseck in their experimental work on animals and cadavers, show that the skull and spine can be

moved in any direction without altering the position of the needle and without damage to the structures in the bony case.

The one point that stands out in favor of cistern puncture after familiarizing oneself with the method is the ease of the operation. The landmarks are distinct and definite. The entrance point at the cisterna is so much larger than the opening permissible in the lumbar spine that it allows a greater range of operating field. Bleeding is encountered much less frequently in the cistern route, because the needle passes through a bloodless field; if blood is obtained it means that the vein plexus lateral to the ligament has been punctured. Finally, there is decidedly less discomfort to the patient. McCusker notes that in 55 cistern punctures there was a consistent absence of pain on piercing the dura, and no puncture headaches or nuchal aches followed the operation, in sharp contrast to the many lame backs after lumbar puncture.

Before attempting the operation on the living, one should first acquaint himself with the landmarks, feel, and "give" of the technique on a cadaver. After a feeling of security is established the operation on the living may be attempted.

In infants and children the primary clinical application of this method would be in combating cerebrospinal meningitis and its complications. Epidemic meningitis attacks essentially the meninges of the base and the convolutions of the brain. The ordinary dose of serum given by the lumbar route is not sufficient to fill the subarachnoid space of the spine, so that the base and convolutions where the greatest damage is being done remain inadequately treated. By giving serum then directly at the base, the seat of severest infection and damage, we may expect a quicker and more complete cure.

Blocking of the foramina of Magendie, Key and Retzius by a plastic exudate around the fourth ventricle, with the resultant internal hydrocephalus, has been one of the frequent and disastrous complications of epidemic meningitis. Applications of the serum directly to the area involved reduce the incidence of this complication, and should it occur would afford a method of cure. It would lessen the necessity for ventricular puncture as described by Blackfan, and would make the latter procedure only one of necessity to relieve internal pressure because most of the block pathology is caused by adhesions on the external surface of the brain stem.

Spinal block with resultant xanthochromia below the point of stricture cannot be treated successfully in any other way than puncture above the blocked point.

Spinal lavage where the pus is thick or in great quantity, or where there are other meningitic infections, can easily be accomplished by dual puncture in both lumbar and cistern points.

Splenectomy for Purpura Hemorrhagica.

COHN and LEMANN *(Surgery, Gynecology and Obstetrics,* May, 1924) state that they believe the blood platelets represent a definite blood entity; that they are derived from the megacaryocytes of the bone-marrow. The present hematological picture of purpura hemorrhagica consists of a diminished platelet count, a normal coagulation time, a prolonged bleeding time, and a non-retractile clot. The diminished platelet count is a characteristic and outstanding mark of the disease. There are appended to these general remarks the reason for splenectomy and citing successful cases, and in particular that of a boy five and a half years old, presenting all the symptoms of purpura hemorrhagica, together with the characteristic laboratory findings. After a somewhat stormy and slow convalescence, recovery seemed to be complete.

A diminished platelet count bears the same relationship to purpura as an indicator as the fall in the blood-pressure does to shock, or the thermometer to febrile reaction.

Platelets are derived from the mega-

caryocytes of the bone-marrow. Conditions which activate the bone-marrow increased the platelet count, and vice versa; inhibition of the marrow actually diminishes the platelet count. According to the observations of Lee and Minot, "the number of platelets as a test of bone-marrow activity is of great value . . . After hemorrhage a great increase of blood platelets indicates a satisfactory attempt for blood regeneration."

Bordet and Delanges in their theory of coagulation (accepted by Frank and others) state: "Thrombin, the active coagulating principle, is not present in the blood, but is formed by the union in a calcium medium of two substances, cytozyme and serozyme. The thrombin then coagulates the fibrinogen. Calcium is not necessary for this step. Cytozyme is derived chiefly from the blood platelets and to a certain extent from the leucocytes (Lee and Vincent)."

Cole in 1907 produced an antiplatelet serum by repeated injections of alien blood platelets. Le Sourd and Pagniez injected animals intravenously with antiplatelet serum and were able to produce a condition of the blood closely resembling that found in purpura hemorrhagica. There was a rapid disappearance of platelets, the blood clotted in the normal time, but the clot failed to retract. They had previously showed that retraction of the clot depended on an abundance of platelets.

Evidence points to the fact that the platelets are formed in normal number, but that they are destroyed by the spleen and other members of the reticulo-endothelial system.

Splenectomy is followed almost immediately by a great increase in platelets. This could not occur if the condition was due to a diminished production.

It is plausible and rational to believe that the spleen and other members of the spleen apparatus may and do cause, by hyperactivity, a destruction of platelets, and therefore that splenectomy is the logical treatment for purpura hemorrhagica which does not readily respond to repeated transfusions.

Hemophilia is a condition from which purpura hemorrhagica must be differentiated. In hemophilia the platelets are present in normal quantities.

According to the present conception of the blood findings in the various hemorrhagic diseases, splenectomy is not indicated in hemophilia and purpura simplex.

Headache as a Sequel of Minor Head Injury.

TROTTER *(Lancet,* May 10, 1924) discussing the subject of serious headache as a sequel of apparently slight or trivial head injury, notes there are two types of accident followed by this sequel; both are fairly common, of quite moderate severity, and seem at the time of infliction to have caused no definite or severe cerebral injury. In fact, the mildness of the whole affair often causes both patient and doctor, if one is consulted, to congratulate themselves on no harm having been done, and to ignore the necessity for precautionary treatment.

In one type the accident is a fall on the head, as, for example, from a horse. The patient develops slight concussion of the brain; there is momentary unconsciousness which is quickly recovered from, and is followed by dizziness and headache, which clear up in a comparatively few hours.

In the second type of injury the violence is characteristically limited to a localized area of the skull. This may be produced by the patient accidentally running against some obstacle, by a blow from such a weapon as a stick or sword, or by the grazing impact of a bullet. In these cases concussion is characteristically absent; there is no loss of consciousness, and the patient retains a clear memory of the moment in which the injury was received.

We have, then, a patient who has sustained one or other of these accidents. He has been shaken and is in some discomfort for a few hours or even a day or two, but has already begun to feel that, ugly as the affair seemed at the moment, no harm has been done; and then he begins to suffer from headaches.

If headache has been a well-marked im-

mediate consequence of the injury it may be continued into the sequelar headache we are considering. If the patient has been laid up as the result of the injury, the headache is apt to come on when he resumes active life. In any case it is often a week or two before the patient realizes that he is faced with a distressing and disabling trouble that shows no tendency to early spontaneous recovery.

It is usual and almost characteristic for the headache to occur in attacks which last for periods varying from a few hours even to two or three days. Between attacks the patient may feel absolutely well in every way. The attacks are apt to be brought about by physical exertion severe or prolonged, or by mental excitement, anxiety or fatigue, and by such combined influences as walking in bright sunlight or in crowded streets, and the many not always obviously exacting activities of town life.

The pain is of a severe throbbing, bursting character. Like that of migraine it is made worse by any effort, and by bright light or loud noise. It may prevent from sleeping, but like many other kinds of headache is often brought to an end by prolonged sound sleep. During the attack the patient is usually restless, intolerant of company or of any kind of attention, and irritable. In severe cases there may be during the attack almost maniacal irritability and sometimes a semidelirious excitement. The severest attacks do not usually last more than a couple of days.

It is possible, and indeed quite common, for these symptoms to occur without there being any physical signs of definite brain injury. There can be little doubt, however, that these traumatic headaches are due to definite organic disturbance within the skull.

Headache of organic origin is a direct expression of disturbances of intracranial pressure, however these may be produced. Such a conclusion is in obvious agreement with clinical experience. It is probable that in nature a reduction in intracranial pressure is but rarely the cause of headache. It is plain, however, from the arrangement of the dural septa, that a local reduction in pressure can give rise to painful stretching until the disturbance has become equalized. This, of course, is the mechanism by which is produced the headache that often follows the withdrawal of fluid by a lumbar puncture.

When a disturbance of intracranial pressure is severe or rapidly progressive the consequent headache is continuous. When the disturbance is moderate, and either stationary or only slowly progressive, the headache is apt to be only paroxysmal.

As to the nature of the disturbance in the case of traumatic headaches, we have a large body of direct evidence observed at operations. On such occasions there is always some increase in the intracranial tension, but usually this is only moderate in amount, since an operation is not likely to be undertaken during the actual course of an attack. This increase of tension is associated with one or other of two conditions of the brain itself. In cases in which the headache has followed an injury causing concussion, the brain is edematous and exudes an undue amount of fluid when exposed. In cases in which the headache has followed a localized blow on the head, and the region struck has been explored, the brain shows by its swelling and blood-staining that it is the seat of a localized bruising. It is highly probable, therefore, that in both cases the increase of intracranial tension is due to the brain being swollen as the result of bruising: in one type of case, probably throughout its substance; in the other type chiefly, at any rate, at the point struck.

Traumatic headaches are notoriously capable of persisting for many years, and the difficulty can be met only by the recognition of a very important and perhaps the only really special principle of intracranial pathology. This principle is concerned with the unique status of the brain as the one organ in the body enclosed by a capsule which is wholly inextensible by any physiological force.

It is surprising how long after the injury the signs of contusion will remain evident

in the injured area. This inordinate and unique delay in the resolution of contusions is fully adequate to account for the striking persistence of traumatic headaches.

In relation to forces of adequate magnitude and kind, the skull behaves as a yielding and highly elastic structure, capable of undergoing considerable distortion and recovering its form without fracture. It is this property which permits of the occurrence of a whole range of important cerebral injuries altogether apart from fracture of the skull.

The skull is apt to be distorted in two different ways. One is the result of a fall on the head, when the cranium is compressed between the surface the patient lands on, and the weight of the body conveyed to the base by the spine. In this case a general deformation occurs diminishing the volume of the cranial cavity as a whole, and causing the acute compressive anemia which is represented clinically by the instantaneously oncoming paralytic phenomena known as concussion. The second type of distortion is a local deformation due to a localized blow on the head. Here of course there is no general squeezing of the brain and no concussion. In both forms of deformation the brain is apt to be bruised, and when this occurs without fracture of the skull and without other cerebral injury we may get the pure form of traumatic headache due to simple unresolved cerebral contusion.

The headache of unresolved cerebral contusion is fortunately sometimes preventable and almost always curable. Prevention is possible chiefly in relation to the widespread but slight degrees of contusion associated with general deformation of the skull and concussion. It is to be attempted by the strict application of the old clinical maxim that every case of concussion must be treated by a definite period of rest in bed, and the very slow and cautious resumption of active life. The duration of such precautionary treatment may, to some extent, be regulated by the presumptive severity of the contusion in the given case. The best measures of this are the extent of the patient's loss of memory for the period of the accident, and the intensity of the so-called phenomena of reaction that have followed the concussion. Supposing headaches to have developed in spite of proper preventive treatment, they may be dealt with by another and lengthened period of rest in bed. This failing, a moderate decompressive opening in the skull and dura is practically certain of success. It should be made at the place of election low down in the right temporal fossa under the muscle. Localized contusion, as it has to be more intense to produce similar symptoms, is less amenable to precautionary treatment by rest, and is more likely to call for primary operative treatment. This consists in making an opening in the skull and dura over the contused region, so that the latter may be released from pressure, its normal circulation reëstablished, and resolution occur.

There are certain cases in which the occurrence of a serious amount of local cerebral contusion may be assumed to be present from the very nature of the injury. Such an injury, for example, is a glancing blow by a rifle bullet. Here, though the skull seems to be intact, and even the scalp is only grazed, cerebral contusion may be assumed to be present, and operation advised, even in the absence of any early symptoms.

Gastroenterostomy in Gastric Ulcer.

BASTEDO *(International Journal of Medicine and Surgery,* May, 1924), considering the subject of gastric ulcer and gastroenterostomy from the medical point of view, quotes Crile to the effect that to do a gastroenterostomy is just as much a confession of failure as to amputate a limb; and further states that, recently, a famous surgeon told him that he is undoing more gastroenterostomies than he is doing.

In cases of pyloric obstruction, gastroenterostomy is a satisfactory operation, but when there is not pyloric obstruction it relieves the antrum and pyloric end but little if at all from peristaltic activity, from high peristaltic pressures or from the irritation

of food and gastric juice; it does not favor gravity drainage; it does not shorten the emptying time unless the stoma is made too large; it does not much lengthen the emptying time unless the stoma is made too small or contracts rapidly; and it does not relieve by the neutralization of acid by the bile and pancreatic juice which it permits to enter the stomach. This last is the greatest fallacy of all, yet it is persistently urged as a good reason for the operation.

A gastroenterostomy always produces a damaged abdomen and a damaged stomach, with a new anatomy and a new physiology; and it permits the passage of the acid and sometimes highly acid gastric contents into a jejunum which is habituated only to material that is alkaline or on occasion slightly acid. Because of technical mistakes or for other reasons it is followed with considerable frequency by undesirable or serious sequelæ: for example, in from 2 to 5 per cent of cases it substitutes a new ulcer, marginal or jejunal, for the one it was designed to cure. It has an operative mortality of 2 to 6 per cent. It has an ultimate high mortality (17 per cent at the Mayo Clinic in cases observed for an average of three to six years). It may give the patient relief for a time, only to have him return later with a recurrence of symptoms which, because of the surgical damage, are more difficult than ever to overcome.

The most common untoward sequelæ are: Renewed ulcer symptoms, retention symptoms, nausea and fulness without retention, and gastrocolic or jejunocolic fistula.

After a remission of a few weeks or months, brought about by the rest and diet following operation and similar to remissions after medical treatment, the symptoms recur. Von Haberer's two cases, in which the ulcer persisted in spite of two operations in each, have many duplicates. Moynihan says: "In some of the re-operated cases the ulcer was still open and had usually perforated and become adherent to the liver."

In spite of a well-functioning gastroenterostomy done for ulcer near the pylorus, McKnight reports the subsequent development, at long intervals, in the same stomach, of two ulcers with perforation, at points some distance away from each other and distant from the gastroenterostomy stoma. Moynihan tells of two patients who developed gastric ulcers after gastroenterostomy for duodenal ulcer, the stomach having shown no lesion at the operation. Luckett had a case which on a bland diet and with a perfectly working stoma developed a penetrating ulcer of the lesser curvature seven months after a gastroenterostomy had been done for duodenal ulcer. There are many other reports of the development of new gastric ulcers in the presence of a successful gastroenterostomy, the original ulcer having been either duodenal or gastric. In other words, the condition established operatively for the express purpose of curing an ulcer permitted the development of a new ulcer.

The development of a marginal ulcer at or about the anastomosis, or an ulcer in the jejunum below the stoma region. These are serious ulcers and they were unknown before the period of gastroenterostomy. In 79 such, reported by Gossett, 24 perforated, 10 developed jejunocolic fistula, one a gastric fistula, and two jejunogastrocolic fistulæ. Deaver says that they occur in 2 per cent of cases, and their operative treatment is beset with many difficulties.

Retention or obstruction symptoms may result from failure of the stoma or obstruction of the jejunum. So far as cancer development is concerned there is no especially preventive value in a simple gastroenterostomy, and the statistics would indicate that there is very little preventive value in any kind of surgery. Such cases, of course, are not amenable to medical treatment, but it would seem evident that the claim that surgery gives a better chance than medical treatment of forestalling cancerous development is not a just one. And even if it were the custom to operate on all ulcer cases, and at the operation to remove the ulcer, which in a large percentage of operative cases is not now done, it is probable that the chance of lessening deaths from cancer in the possible 5 per cent of

cases which apparently develop from an ulcer would be offset by the immediate or remote risk of such wholesale surgery. Indeed the evidence suggests that ulcers which give rise to cancer are the large ones of the posterior wall adherent to the pancreas; for these surgery with excision or cautery obliteration is the correct treatment.

In the non-obstruction case which is not obviously surgical, barring the effects of some delay under favorable conditions, proper medical treatment, as a rule, does no harm, and if it is unsuccessful soon proves the need of more radical measures. Even Deaver admits that "as a preparation for operation, medical treatment has its usefulness." Thus after a medical failure the patient can usually be turned over to the surgeon in better condition for surgery than before the medical treatment. Eggleston reports that after a period of at least three years had elapsed, 72 per cent of 156 cases treated medically had no return of symptoms, and of the 28 per cent showing recurrence the average duration of the institutional treatment had been only three weeks.

In 273 traced cases of gastroenterostomy for duodenal and gastric ulcer, Smithies found only 57 (20.9 per cent) clinically free from digestive complaints, and Deaver wrote, "of the cases in which the ulcer was not excised, and in which only a posterior gastroenterostomy was done, 18 per cent reported freedom from symptoms one to five years later." Crile reports that five years later only 17 were alive out of 70 cases operated upon for gastric ulcer, and Denechau that about 20 per cent showed good results four to twelve years after operation.

Deaver has stated that "a chronic ulcer is a chronic ulcer until removed, and there is no treatment for it except surgical excision." Yet even in ulcers of long duration non-surgical measures are often effective, for at post-mortem Stewart found healed chronic ulcers as frequently as healed acute ulcers, and in Eggleston's series of 156 cases, of which 113 were cured medically, the average duration had been seven and one-half years.

The imperative reasons for surgery then are: (1) The ulcer endangers life, either rapidly by perforation or hemorrhage or slowly by cancerous change. (2) The ulcer is of the type that will probably not heal otherwise. (3) The ulcer or its scar seriously impairs the stomach functions as in pyloric obstruction cases, or causes persistence of distress. (4) The patient cannot or will not follow a proper medical régime. The only groups suitable for a simple gastroenterostomy are the two last.

When a case is medical the relief of symptoms (not the cure) by treatment is, as a rule, quite prompt. Therefore failure of the treatment to relieve the symptoms in two or three weeks suggests that the case is probably surgical. Furthermore, if the patient shows a positive Wassermann reaction or gives a history or any physical evidence of syphilis, antiluetic treatment should be tried. If the combined antiluetic and ulcer treatments fail to relieve, surgery is indicated.

In summing up the effects of surgery in gastric ulcer, we can say that after gastroenterostomy, simple or with excision, while there has been a good percentage of cures, some have died in the immediate postoperative period, some have failed of cure, some have had recurrence of ulcer, some have developed new ulcers, some have perforation, hemorrhage or extension to other organs of the original ulcer, some have had disastrous or even fatal surgical after-effects, and some have died of cancer.

Emphysematous Gangrene.

GEMMILL *(Surgery, Gynecology and Obstetrics,* May, 1924) comments upon the confusion which exists in regard to the clinical symptoms produced by the Bacillus aerogenes capsulatus and by those incident to infection with the bacillus of malignant edema, the so-called vibrion septique. In some respects the infections resemble each other, particularly in regard to the develop-

ment of crepitation. The manifestations of malignant edema coming on more slowly than do those of gas-bacillus infection, there is a more obvious line of demarcation, and yellowish lines trace the course of the lymphatics, resembling those incident to a streptococcus infection. The muscles are not invaded by malignant edema, nor do surgical procedures seem in any way helpful.

The rapid onset of symptoms incident to gas-bacillus infection is characteristic. Crepitation is usually the first symptom noted, though it has been pointed out that the *x*-ray will detect air spaces long before this symptom can be noted. This bacillus particularly flourishes in muscular tissue and is benefited by appropriate surgery.

Gemmill holds that these infections are much more common than reports would lead one to suppose. They are either unrecognized or unreported, and he urges special care against communicating infection by fomites.

In this relation Snyder's (*ibid.*) report of an abscess of the liver due to aerogenes capsulatus is of interest. After reviewing the literature of the subject and case reports, he records the history of a physician, sixty-eight years old, who two years after a gall-stone colic was seized with chill and fever. A diagnosis of acute cholecystitis having been made, the abdomen was opened, disclosing a perforated gall-bladder with an abscess the size of a hen's egg at the junction of the cystic common duct. Also, on the under surface of the right liver lobe, there was a mass the size of a lemon, pus from which showed a pure culture of aerogenes capsulatus. Pus from the gall-bladder and common ducts revealed the presence of a mixed infection. The wound discharged large quantities of foul-smelling pus for ten days, and the fascia of the abdominal incision sloughed extensively. On one occasion a piece 14 inches in length and a quarter of an inch wide was removed intact.

The patient recovered from his operation and enjoyed good health for seventeen months, when symptoms of malignancy appeared. He died two months later. The autopsy showed primary carcinoma of the gall-bladder with secondary growth in the liver and wide diffusion.

The Results of Surgery for Migraine.

BUCHANAN *(Surgery, Gynecology and Obstetrics,* May, 1924) defines migraine as a biological character of man characterized by paroxysmal attacks of pain, usually in the head, either unilateral or bilateral, but occurring also in the abdomen, and associated with nausea, vomiting, mental depression, disturbances of sight, and many vague somatic disturbances. One or all of the symptoms may occur in an attack. The main manifestations start first in early life, and as a rule terminate during the fourth decade. The processes taking place before, during, and after the attack are entirely unknown. In 1919, on material collected in the Mayo Clinic, it was demonstrated that migraine was transmitted through the germ plasm according to Mendel's two laws. All hereditary characters are transmitted from generation to generation as an integral part of the germ plasm of the individual who bears the character. The character forms a natural part of the life cycle of such individuals. Migraine occurs in man as a result of the integral constitution of his germ plasm and is the expression of a normal physiological status. The condition is not a disease because it produces an inconvenience to its bearer. The person bearing the migraine character is no more abnormal than a person with brown or blue irides.

He notes that 75 per cent of 1335 patients were operated on from one to seven times for the relief of migraine. The histories of this large number of patients furnish data which are valuable for estimating the end-results of operations for the relief of migraine. The operations were performed by surgeons all over the United States and varied in magnitude from cerebral decompression and colectomy to circumcision of the clitoris.

The end-results from all angles of sur-

gical attack were the same. Not a single patient among those who were operated on was cured or relieved more than temporarily, while those patients who were unfortunate enough to have their reproductive organs removed, or have a gastroenterostomy formed, were made much worse on the part of migraine as well as generally. In those cases in which a gastroenterostomy had been formed, the health was partially or wholly restored to the original status by the undoing of the gastroenterostomy.

Treatment of Benign Hypertrophy of the Prostate with Radium.

BURNAM and NEILL *(Urologic and Cutaneous Review,* May, 1924), alluding to the opinion that radium is of little value in treating simple hypertrophy, hold that such opinion is due in part to the limited trials given radium in these cases, in part to the fact that operative treatment yields such splendid results and is so widely practiced. Doubtless the employment of radium solely, or mostly, in very advanced cases "too ill for operation" has given a poor opinion of this agent. Undoubtedly the discomforts associated with the application, difficulty in avoiding complications, and slowness in obtaining results by intraurethral, intravesical, intrarectal and intraglandular techniques have had a markedly discouraging effect on the outlook of this form of treatment. Be this as it may, the external or "pack method" of treatment in not too advanced stages is simple of application, painless, easily controlled, and may be followed by very gratifying results.

The present study is based on 29 cases, the majority of which were in early stages of the disease. Seventeen of these 29 men have been completely, or almost completely, relieved of all discomforts, while 12 have not been materially benefited. A large majority enjoyed general good health. In only five cases were there found serious ill health and dangerous complications, such as leukemia, heart disease, etc. All five of these patients belong in the group which were not benefited by the treatment. The average age was sixty-three years. The oldest man treated was eighty-four and the youngest forty-eight years of age.

Considering the 17 favorable results, it would seem that the effects are of a permanent character. One man following his treatments remained well for 5½ years, then had a slight return of discomfort, but responded promptly to retreatment and has been entirely free from all abnormal symptoms for thirteen months. Not every patient acts in this way, as is shown in a second case in which relief for thirteen months followed the first treatments, and in which on recurrence there was a failure of the second series. This case of temporary relief reduces the cured group to 16. The longest period of relief has been 5½ years and the average of the entire group eighteen months.

The prostate gland should be accurately located and just a wide enough portal taken to insure the radiation of the whole gland from each field of exposure. The abdominal portal is in the midline just behind the symphysis. The perineal portal is between scrotum and rectum, and the sacral portal about the middle of the sacrum. The screening distance is 3 inches, lead 2 mm., brass 1 mm., aluminum 3 mm., rubber 3 mm. This particular arrangement cuts out all but radium C gamma rays and does away with secondary radiation arising from the lead.

As a rule the entire treatment is given at one sitting and is not repeated under twelve weeks. It is well to keep the patient in the hospital for the first forty-eight hours, and in the advanced cases with retention much longer, as catheterization and general care may be necessary.

It would seem that more than half of all early prostatic hypertrophies can be relieved by radium treatment; that some of the advanced cases can be helped; that the treatment should be principally given by the pack or external method. As this treatment in no way interferes with subsequent prostatectomy and is a much milder procedure, it would seem that it might be used

to advantage in all early cases. It should certainly be used before resorting to intravesical, intrarectal, and intraprostatic radiation.

Hirst's Transperitoneal Cæsarean Section.

HODGKINS *(Boston Medical and Surgical Journal,* May 29, 1924) has routinely used since 1920, and in 43 cases, the operation described by Hirst in 1913. Hodgkins has had no maternal mortality, two still-born babies, and one atelectatic death.

Any well-trained surgeon capable of doing the classical operation can do the Hirst with only a slight increase in time. It demands some dissection of layers, which is objectionable to the habitual classical Cæsarean operator, but this becomes less objectionable as the purpose is realized. The great majority of cases are not emergencies, and rushing through is unnecessary. The accidents occurring as a result of rushing and blind operating have done much to condemn the operation, and perhaps a bit more care in the handling of tissues may bring more favorable criticism for the future.

The skin of the entire abdomen is first shaved and then scrubbed for fifteen minutes with tincture of green soap and water, plenty of irrigation being used. This is followed by another scrub with alcohol for five minutes. Sterile towels are either strapped on with adhesive plaster or an abdominal binder applied to hold them in place. The vulva is washed with 1:1000 corrosive solution and a sterile pad replaced.

The operator stands on the patient's left; an incision is made in the median line from the symphysis to the umbilicus, down to the peritoneum. It is of distinct advantage to incise the fascia close into the symphysis, as a much more roomy incision is afforded by this seemingly small detail. Towels are then clamped to the skin edges by means of Moynihan towel clamps, and the peritoneum is picked up and opened exactly in the line of incision from the top of the bladder to within an inch of the upper angle of the wound. The bladder and lower uterine segment are then exposed. Rarely, if ever, are intestines or even omentum seen. The vesico-uterine fold of peritoneum is distinct, and beginning at this point an incision, barely through the visceral coat and not into the uterine muscle, is carried up to exactly approximate the incised parietal layer at its upper angle. (In this step a clean knife-blade should always be used.) Separation of the bladder from the cervix is accomplished easily and quickly by blunt pushing motion with the fingers. Beginning at each side of the separated bladder the visceral coat is dissected off the uterus by pushing the cut edge and using a sweeping motion. The layer ordinarily is loosely attached, and this maneuver may even be accomplished with the index-finger. A one-and-one-half inch flap is planned. Snaps are placed, joining the parietal and visceral peritoneal layers. As a rule not more than eight are required—three on each side, one at the bladder angle, and one at the upper angle. These snaps also serve as a guide for suturing the layers correctly and evenly in the next step. In their order, two snaps at a time are now held up and a suture placed in the interspace; snaps and sutures now alternate all around and one inch apart. An extraperitoneal pocket is now created and the uterine muscle is exposed for incision. Snaps are left in place during extraction of the head, as they provide additional security against tearing and leakage.

The Proper Evaluation of Local Anesthesia.

MAES *(New Orleans Medical and Surgical Journal,* May, 1924) states that as a rule in most of our institutions we are compelled to depend upon an ever-shifting class of internes who are not interested in this branch of surgery, as they do not intend to follow it. The long induction period with the patient held down by several attendants, the discomfort of the surgeon who operates on a struggling patient, and the consequent stormy postoperative course, have suggested

in many instances a resort to local anesthesia. For this reason, if no other, it is well for the general surgeon to acquaint himself with the technique of local anesthesia, which will not only add to his usefulness, but will be an incentive for him to keep himself informed in anatomy, for a man to be proficient in local and regional anesthesia must be a competent anatomist.

It is all the more imperative to be familiar with all phases of local anesthesia as it does not seem likely that the supply of general anesthetists is likely to increase at any time in the near future.

In so far as actual operations are concerned, it is usually agreed that in those surgical procedures where anatomical lines can be followed, such as hernioplasties, removal of tumors, and dissection of nerves and blood-vessels, regional and neuro-regional methods of anesthesia have their greatest field of usefulness.

Most of the deliberate operations on individual abdominal organs can be successfully performed under local anesthesia, including the appendix, the gall-bladder, the organs of the female pelvis, and the kidneys, but in at least 35 per cent of patients with intra-abdominal disease there is more than one condition present, and a certain amount of exploration is always indicated. Opening and closing the abdomen is simple enough, injection of the mesentery of any single organ will control local pain, but an attempt to work beyond a limited area is always accompanied by a sickening feeling referred to the epigastrium, and is almost invariably followed by vomiting, and partial or complete evisceration with its usual serious consequences, often necessitating a general anesthesia to replace the extruded organs.

In operations for the cure of hernia, the avoidance of recurrence must be a prime consideration, and it is an admitted fact that the incidence of recurrence is in almost direct proportion to the number of deep infections following the operation. Suppuration is three times as frequent after local anesthesia as after general, and this in spite of the fact that operators are usually more careful in handling tissues when patients are awake. This is fairly conclusive evidence that the use of local anesthesia does reduce local resistance to infection.

Some Types of Recurrent Pyelitis.

FARMAN *(California and Western Medicine,* May, 1924) refers to the larger incidence of pyelitis in women than in men and the fact that 90 per cent of renal infections are caused by the colon bacillus. He notes that elderly women are prone to chronic recurrent types of infection, and that pyelitis in young women occurs more commonly after marriage than before.

As to treatment the writer advises rest in bed, emphasizes the importance of a diet which reduces acidity, particularly commending orange juice, one glass of which should be taken at each meal, administers citrates and carbonates in large doses and, on the subsidence of symptoms, gives hexamethylenamine in small doses. If the infection tends to become chronic, or persistently recurrent, the ureters are catheterized and the kidney pelvis is washed out with 1- to 2-per-cent silver nitrate solution, this being repeated once or twice a week. In the pyelitis of pregnancy this pelvic lavage is the most efficient of any single means of treatment. Lesions causing obstruction, of course, require major surgery.

Hemorrhoids.

FANSLER *(The Journal-Lancet,* May 1, 1924) calls attention to the fact that the area of acute sensation is the anus and anal canal. Above this point there is practically no sensation. He is opposed to the use of a rectal plug after operation because it excites painful spasm of the sphincter and levator ani muscles. Raw surfaces can be held apart by rubber tissue and gas pressure can be provided against by the use of a small rubber catheter. The bowels should be moved twenty-four to thirty-six hours after operation, liquid petrolatum by the mouth being the best means of secur-

ing this end. Hot sitz bath is an admirable method of relieving pain. It should be started twent-four hours after operation. Blood from the bowel does not always mean hemorrhoids, it often means cancer.

There are three conditions which indicate that some radical procedure is advisable: persistent or recurrent hemorrhage; frequent prolapse of the hemorrhoids; pain.

Pain in simple uncomplicated hemorrhoids is rather unusual, and, if present, some complication should be suspected. A dull ache is not so unusual, but sharp pain almost always means that a thrombus has developed in an external hemorrhoid, or that an internal hemorrhoid has prolapsed and become strangulated. These conditions are easily discerned by inspection; pain is not due to hemorrhoids alone, but to some other condition.

Persistent or recurrent bleeding or protrusion indicates that the hemorrhoidal condition is at least fairly well advanced. There may be periods of remission from time to time, but the general trend of the condition is for the worse, and sooner or later something of a radical nature will have to be done. Waiting simply aggravates the condition.

As to the choice of procedure, at the present time there are three widely employed methods, namely, the clamp and cautery, the ligature, and the obliteration of the hemorroidal vessels by electrolysis or interstitial injections.

Unfortunately, the method of obliteration until recent years has been largely in the hands of quacks, who, armed with a hypodermic syringe and a bottle of solution, guaranteed to "cure without the knife" and injected all who came their way. Their technique was often bad and their judgment worse, and the result was that this method fell into the disrepute which it does not deserve. It requires greater judgment and experience to get good results from electrolysis or injection than it does to operate. The obliterative method has the advantage of permitting the patient to pursue his usual occupation and does not necessitate confinement to the hospital. This method is only suitable for internal hemorrhoids, but, if external ones are present, they may be operated on under local anesthesia at the physician's office. To treat a case properly by this method requires from six to eight weeks, although the time may be shortened if the patient does not have to work.

Local Anesthesia in Neck Operations.

MEEKER and HUNDLING *(Surgery, Gynecology and Obstetrics,* June, 1924) regard the neck as one of the most favorable regions of the body for performing operations under local anesthesia, the anatomy being such that either infiltration or regional methods may be employed. They advise this procedure for thyroidectomy, laryngectomy, thyrotomy, removal of tumors, excision of esophageal diverticula, removal of lymphatic glands, excision of branchial cysts, tracheotomy, ligation of thyroid or carotid vessels, and cervical laminectomy.

They advise against its use in excision of furuncles and carbuncles, extensively degenerating glands of the neck, and widely disseminated carcinomatous glands. They give a brief but excellent and well illustrated discussion of the anatomy of the part in so far as the nerve supply is concerned. Detailed instructions are given for blocking by the posterior, the lateral, and the direct routes.

The lateral oblique method is preferred by the authors, they holding that thus may be avoided injury to the vertebral vessels, or puncture of the dura, and stating that in the last two years bilateral cervical plexus block by the lateral oblique method has been employed 272 times and unilateral block 24 times. There have been no convulsive seizures or collapse and no clinical manifestations of functional disturbances of the vagus or phrenic nerves.

Terminal infiltration is the method of local anesthesia commonly employed in thyroidectomy. The plexus block gives better relaxation of the muscles of the neck and greater facility in the use of retractors. In such cases from 25 to 30 cubic centi-

meters of a 0.5-per-cent solution for each plexus, and from 30 to 50 cubic centimeters for subcutaneous infiltration, are employed. In non-toxic cases 10 minims of adrenalin 1:1000 are added to each 100 cubic centimeters of solution. When a one-per-cent novocaine solution is employed in the plexus block, subcutaneous infiltration is not necessary, although a longer period of waiting is required for the development of cutaneous anesthesia.

Vaccine Treatment in Pruritus Ani, Vulvæ, and Scroti.

MONTAGUE *(Medical Journal and Record,* June 18, 1924) speaks of the inefficiency of the methods of treatment in vogue, refers to one patient who came to him after suffering for forty years, and holds that the only vaccines that appear appropriate are those of the bacillus coli from the deeper layers of the tissue, and the bacillus coli and staphylococcus albus. He regards vaccines as a general aid and not as a substitute for procedures directed to the destruction of the infective focus. He believes that gratifying results are fairly certain in cases characterized by the presence of excoriations or erosions. He does not favor autogenous vaccines. He begins with the staphylococcus albus stock vaccines. If response is not obtained by the third injection he uses the bacillus coli vaccines in addition.

A small dose at the start, with a gradually ascending amount until a distinct reaction occurs, appears to be the best method of arranging the doses. When a distinct reaction, either focal or systemic, has been obtained it is well to note the amount necessary to produce this and consider it the normal maximum dose for the individual.

The vaccines may be given from one to three days apart. In some cases relief is rapid, and, if properly selected, all cases show a distinct palliation after the first two or three treatments. Vaccine therapy, depending as it does upon the evocation of immune response on the part of the body, demands a reasonable length of time in which to allow these processes to occur. Likewise, it should be continued for four to six weeks after the primary palliation.

The preferable method of administering vaccine is by subcutaneous injection through a small-gauge needle into the buttock, arm, or adipose tissue of the abdomen. The other methods available are intramuscular or intravenous, but they possess many dangers not involved in the above method and no advantages of therapeutic value. Protection by the evocation of immune reactions, *i.e.*, by the use of vaccines, is logical not only in cases actually suffering from bacterial invasion, but also in those which by scratching will eventually weaken or remove the normal barrier to infection, *i.e.*, by abrading the skin.

Radium Treatment of Carcinoma of the Antrum.

JOHNSON *(Surgery, Gynecology and Obstetrics,* June, 1924) quotes Ewing to the effect that these malignant growths may be papillary carcinomata, carcinomata of basal-cell type, squamous-cell carcinoma, cylindrical carcinoma, and round-cell carcinoma of atypical structure, often designated as sarcoma. Dental tumors not infrequently develop in the antrum and are due to the squamous and glandular types of adamantinoma. Rhinologists, ophthalmologists and dentists have the first opportunity of making a diagnosis, since these growths produce signs and symptoms referable to the nose, orbit or teeth long before the presence of an associated tumor is suspected. The first symptom is usually persistent or burning pain over the cheek, often with nasal obstruction and a purulent blood-stained discharge.

The first treatment in these cases is by a maximum "pack" treatment from a distance of 6 centimeters. The "pack" is a flat brass box with walls 2 millimeters thick, and an area of 77 square centimeters, containing silver capsules of glass emanation tubes. The dosage given is about 9000 millicurie hours, which will produce a slight skin erythema. The lymphatic glands

of the neck are treated in the same way. The heavy infiltration shuts off all but the deeply penetrating rays.

As to operative treatment, the first step consists in making a 10-cm. skin incision, under local anesthesia, along the anterior border of the sternocleidomastoid muscle, exposing the lymph-bearing tissue adjacent to the jugular vein and lying in the posterior submaxillary space. If there is a macroscopic enlargement, or induration, a complete neck dissection is done. If not, unfiltered emanation tubes are inserted and the external carotid, facial and lingual arteries are ligated. The author reports 400 cases of such ligation, without ill effects.

In exposing the growth for radiation, if there be orbital symptoms the eye is removed, even though it be functioning. Where the growth is downward without involvement of the orbital plate, the approach is from the alveolus. In the advanced cases both openings may be needful. The radium is applied by tying unfiltered emanation tubes in the end of an ordinary rubber finger-cot, and packing it centrally or toward any wall depending on the needs of the case. From 35 to 40 millicuries are used, for periods varying from forty-eight to sixty hours. In six to ten weeks sloughs and destroyed bone are gradually cast off. Frequent irrigations of the radiated area are needful to remove sloughing and necrotic tissue.

There are 24 antral carcinomata on which this report is based. Cervical nodes were present in only three of these. Four unimproved cases, hopelessly advanced, were in poor general condition and died before the results of radiation could be determined. Four cases are showing satisfactory response to the operative treatment, eight cases were improved locally and generally, though never free from malignant growth. In one case the duration of palliation extended to four years. Four cases present no clinical evidence of disease—two for one year; one case for one and a half years; one case for five years.

In addition three cases were free from disease for one year, three years, and four years, but later failed to return to the clinic.

The last case of the group was free from disease for six and a half years, but after neglecting to come for observation for several months, returned with a large recurrence projecting from the roof of the antrum; this is now being treated.

The Importance of Posture in Postoperative Treatment.

MEYER (*Medical Journal and Record*, June 18, 1924) notes that when a patient has successfully gone through the immediate dangers of the operation and the first part of the after-treatment, and he, as well as the others concerned in his welfare, feels easy and is looking forward to a speedy and uninterrupted recovery, there is still one treacherous enemy lurking in the background ready to strike at any moment—venous thrombosis.

This thrombosis usually concerns the left femoral vein, following work done by the surgeon in his every-day routine; also one or more of the pelvic veins after operations on organs within the small pelvis and after childbirth.

From a pathological point of view such blocking of the venous lumen is not a serious matter. The lower extremities and the respective pelvic organs easily stand the disturbance in the normal return flow of the blood to the inferior vena cava. Collateral circulation is plentiful and the comcomitant edema of the extremity—though usually at first greatly alarming the patient and his relatives—subsides after a certain time. Its persistence is rare. Thrombosis in branches of the internal iliac vein may run on without any external manifestations; an unexplainable tachycardia is taken by many as the only outward sign. If the inflammation spreads to the external branch of the common iliac vein, edema of the leg and thigh may become alarming. Meyer speaks of the so-called phlegmasia alba dolens after complicated childbirth.

What medical men fear is the clinical

sequela of the thrombosis: the loosening of a part or of the whole length of the thrombus, which then enters the circulation and is driven as a foreign body through the right heart into the pulmonary artery and the lung, suddenly interrupting the normal circulation of the blood between the right and the left heart.

It is a clinical fact that at least ninety-five per cent (if not ninety-nine per cent) of thromboses of the femoral vein occur on the left side; and if both veins become involved, one after the other, that the trouble almost always starts with the left. The reasons for this peculiarity are principally anatomical.

We know from the investigations of Aschoff that thrombosis occurs in those portions of the venous system in which the flow of blood is retarded provided microorganisms circulate within the blood.

It stands to reason that if we could overcome the normal anatomical impediment in the circulation of the lower extremity at Poupart's ligament and further up in the pelvis, the principal cause for the formation of a phlebitis and therewith of a thrombosis would be successfully met. This we are able to do. Just as we allow our automobile to run faster before we approach a hill right ahead of us, and then see it climb up, usually without changing the gear, we can make the blood current in the femoral veins faster, and thereby the ascent of the blood from the lower extremities to the right heart easier, by raising the lower end of the bed; that is to say, by arranging for a slight degree of Trendelenburg's posture. Blocks placed under the foot end of the bed will allow the blood within the lower limbs to run down hill from the toes to the hips, and in its onrush it will easily reach the veins in the upper pelvis. This simple means of raising the lower end of the bed is the most powerful weapon we possess for preventing the occurrence of femoral (and pelvic) thrombosis.

Reviews

INFANTILE PARALYSIS IN VERMONT, 1894-1922. A Memorial to Charles S. Caverly, M.D. The State Department of Health, Burlington, Vermont, 1924.

This is a very notable contribution to this very important subject. It is made up chiefly of the writings of the late Dr. Caverly, with the addition of contributions from men who have worked with him, or after him, and a statement of the present status of the work which he instituted. While the book was being printed Dr. Robert W. Lovett of Boston died suddenly, and thereby the State of Vermont was deprived of the chief in charge of the Statewide plan for the after-care of the cases of infantile paralysis since it was first undertaken in December, 1914. Of course the volume deals with the various epidemics that have occurred in Vermont, with the treatment of infantile paralysis written by Lovett and Martin, and with special articles by Aycock on the methods provided in that State in the laboratory and clinically. So, too, Amoss and Taylor have made contributions upon the neutralization of the virus, and upon the carriage of the virus, with a chapter upon the treatment of acute poliomyelitis, containing a preliminary note on the use of hypertonic salt solution and convalescent human serum with experiments upon local specific treatment.

In the Introduction it is well pointed out that the fight on infantile paralysis is by no means ended, for we are sadly ignorant of much that is connected with this insidious and virulent malady.

So far as the text of the present volume

is concerned, it may be truthfully stated that it is what may be called a land-mark in our study of this disease, and that no one can devote himself to its study, or write concerning it, for many years to come without turning to this volume as one of the notable contributions to the subject.

HUMAN CONSTITUTION. A Consideration of Its Relationship to Disease. By George Draper, M.D. Illustrated. W. B. Saunders Company, Philadelphia, 1924. Price $7.50.

This book opens with a foreword by Sir Arthur Keene, the Hunterian Professor and Curator of the Museum of the Royal College of Surgeons of England, who well says that the majority of hormones and endocrines will prove to be infinitely more complex than we now think, and that the varieties and grades of temperament will far outnumber our present scheme of classification. The latter part of this sentence gives a key to the text which follows. The book deals chiefly with the method of studying the morphology of human beings, the object of the author being to consider the whole subject of human constitution. For this reason the book is of peculiar interest.

There is too great a tendency on the part of medical men to regard disease of a single organ as if that organ were entirely separate from the rest of the body, and to ignore the fact that each and every part has a definite dependence or influence upon all the other parts. The book is also of value because it is probably the best attempt to put upon a scientific basis what all physicians of large experience learn, or attempt to learn, by the general observation of the patient. Again, it is of importance because such observations give valuable information as to the manner in which an individual will respond to certain plans of treatment. In a crude way this thought was represented by what is now the old-fashioned idea that a family physician possessed peculiar virtue by reason of the fact that he was "familiar with the constitution" of the members of a given family. The ability to reach conclusions as to the general state of a patient with some physicians is almost a lost art, and yet our forefathers in medicine practiced it with an almost uncanny skill and thereby accomplished much.

It must not be thought, however, that Dr. Draper has dealt with his theme in a superficial way, glancing at it as a physician in the office, or at the bedside, might glance at his patient. On the contrary, he goes into the matter most thoroughly, placing before us the results of a very large number of studies which cover the underlying conditions in the various states of the body to which we have referred.

The book is freely illustrated and embodies much original research. Because it occupies a field until now untilled, and also because of its thoroughness, it bids fair to take a foremost place in medical literature and doubtless will be referred to as authoritative for many years to come. It is seldom that a book which embodies original investigation involving a high type of scientific knowledge possesses so much value to the clinician, who by perusing its pages can pass from that state in which he reaches a conclusion as a result of empiricism to another in which a scientific basis exists for his conclusions.

We trust that Dr. Draper's enthusiasm and thoroughness will be recognized by a large demand for his very excellent contribution to scientific medicine.

FUNDAMENTAL PRINCIPLES IN TREATMENT. By Harry Campbell, M.D., F.R.C.P. William Wood & Company, New York, 1924. Price $4.

This book of nearly 500 pages is by no means to be considered as a definite handbook on treatment. It is divided into some fifty chapters, beginning with the Education of the Physician, and then dealing with the Physician's Physical and Mental Personality, The Coöperation of the Patient, Thoroughness in Examining the Patient, and so on. The author also deals with Habits in Relation to Treatment, Fads and Faddists, Poisons Absorbed from the Ali-

mentary Tract, Sera and Vaccines, Endocrines and Ferments, and devotes a number of chapters to psychotherapy, under which he considers Boredom, Enervating Ease, and the Influence of Emotions. Other chapters deal with Housing, Ventilation, Exercise and rules to be observed in prescribing it. There are also chapters upon Diet, and the fiftieth chapter is devoted to what the author calls "Some Important Therapeutic Truths," which might be entitled aphorisms in connection with the text which has preceded them. The author also deals with the Reputation of the Individual Physician and with Enmity among Doctors.

There is a good deal of excellent advice to be found in the pages of this book. It would be a good one to place in the hands of the young graduate who has just come through his hospital experience, and many men of more numerous years can peruse it with benefit to themselves and their patients.

BASAL METABOLISM IN HEALTH AND DISEASE. By Eugene F. DuBois, M.D. Illustrated. Lea & Febiger, Philadelphia, 1924. Price $4.75.

The name of the author of this volume of 372 pages, including the index, is well known to every worker in the medical laboratory and at the hospital bedside. As well pointed out in the preface its subject has during the last few years become of considerable importance to the practitioner of medicine. Most of the literature dealing with this subject has been prepared primarily for research workers or physiologists. The author, therefore, deemed it an opportune time to bring the subject of basal metabolism out of the realm of pure physiology into the domain of clinical medicine, and, therefore, this book has been written for those who are engaged in the practice of medicine and surgery, and for medical students, not forgetting that dieticians will find much in it that is useful. In view of these facts animal experiments have been largely ignored. Recognizing their value to what the author calls the great science of nutrition, nevertheless the author has not considered them as advantageous additions to such a text.

The book is divided into two parts, one of which deals with metabolism in health, and the other with metabolism in disease. Of course the underlying principles of metabolism, so far as we know them, are carefully considered and instructions given as to the methods by which the metabolimeter can be employed; an instrument of precision which, unfortunately, is not readily used by the general practitioner, but which when employed by one who is competent will often give the general practitioner information without which his treatment of a given patient must be crude or erroneous. Our readers, of course, know that this holds true particularly in regard to hypo- and hyper-thyroidism, and in general terms with all disorders of the endocrine glands.

The last chapter in the book deals with the effects of drugs upon basal metabolism. It is interesting to note from the text and from the references how much has been done in this field within the last few years. Nevertheless the author has been able to condense the information which he believes of value into a little more than two pages. We are firmly convinced that as the years go by and subsequent editions are called for, this chapter will be materially increased in size, and we are equally firmly convinced that this is one of the most important fields of research which the metabolimeter has opened up to medical men. It is quite possible that the physiological action of many drugs of which we are largely ignorant or misinformed will be cleared up by investigation along these lines.

ANATOMY OF THE HUMAN BODY. By Henry Gray, F.R.S. 21st edition, thoroughly revised and re-edited by Warren H. Lewis, B.S., M.D. Copiously illustrated. Lea & Febiger, Philadelphia, 1924. Price $10.

We think it can be stated without danger of contradiction that there has never been a book connected with medical science which has lived as long as this and which has met the needs of many generations of

medical students with such completeness. During the many years that have elapsed since the death of its distinguished author, notable men have been called upon from time to time to revise its pages and bring them up to date. It will be recalled that the first edition appeared in 1858 and the first American edition in 1859, and although the uninformed may think that anatomy is the thing which, concerning our knowledge, does not change much, if they were to compare the first edition with the present one they would be astounded at the advances which have been made not only in gross but also in microscopical knowledge. As the present editor well points out, the arrangement whereby embryology, microscopic anatomy and gross anatomy can be studied coördinately is the best for the understanding of the structure of the human body, and such a plan is now followed.

Many new illustrations have been added and some old ones have been replaced by more effective figures. So, too, important references to recent literature have been added to the end of each section, which, as we recall the earlier editions, is an innovation.

Gray's Anatomy is unique not only for the reasons that we have given, but it is also unique in that to be chosen to be its editor is a notable point in the career of any anatomist.

Thoroughly up to date, there is no question that this remarkable work will for many years maintain the position which it has always held.

PATHOGENIC MICROÖRGANISMS. By William Hallock Park, M.D., Anna W. Williams, M.D., and Charles Krumwiede, M.D. Eighth edition, enlarged and thoroughly revised; illustrated. Lea & Febiger, Philadelphia, 1924. Price $6.50.

The subtitle borne by this book since it was first published indicates exactly what it is, namely, "A Practical Manual for Students, Physicians, and Health Officers." The first edition was written to make available for others the practical knowledge which had been acquired in the work of the Bacteriological Laboratories of the City of New York, and the constantly increasing information so gained has found a place in each succeeding edition. In the present edition the text has been rearranged so that the grouping of different microorganisms conforms more closely to the classification adopted by the Society of American Bacteriologists. The new terminology suggested by that Society has been added to the older names. This plan is distinctly advantageous because had the older names been dropped and the new ones introduced, some confusion in the mind of the reader might have arisen. In the present edition, too, the section on immunity has been more thoroughly prepared and enlarged, and by coöperation with the laboratories of other institutions, additional information has been obtained. Possibly the chapter upon the recent additions to our knowledge of scarlet fever, measles, typhus fever, etc., will prove more interesting to the general practitioner than other portions of the present edition.

The authors have called to their aid special workers in the preparation of the sections on Media and on Complement Fixation. The bibliography has been put together in such a way as to provide adequate references without being redundant, and, last of all, a comprehensive summary table has been added, which is designed to give the essential characters of and the pathological conditions caused by each of the commoner microörganisms.

For many years the senior author has been recognized as *facile princeps* among the bacteriologists and immunologists of this country. The present volume is a manifestation of the fact that he will still hold that high position.

ABT'S PEDIATRICS. Edited by Isaac A. Abt. Volume IV. W. B. Saunders Company, Philadelphia, 1924. Price $10.

In earlier issues of the THERAPEUTIC GAZETTE we have favorably noticed this very exhaustive compilation upon diseases of children, which, when complete, will contain ten volumes. As already stated, this is the fourth volume and contains near-

ly 1300 pages with no less than 218 illustrations. Needless to say it is intended to be the most exhaustive work dealing with Pediatrics that has ever been published here or abroad.

The present volume opens with a consideration of Diseases of the Pleura and Lungs, and then proceeds to the surgery of that part of the body. By natural progress it then considers the Physiology of the Blood and the Various Anemias, Primary and Secondary, with a chapter upon Blood Transfusion in Infants and Children. After this the Glands of Internal Secretion are discussed, one hundred and fifty pages approximately being devoted thereto. The various disorders of the genito-urinary tract then follow, with final chapters upon Cystoscopy, Diseases of the Male Genitalia and of the Female Genital Organs in Childhood.

Altogether twenty-six contributors provide the text. They write from various geographical and medical centers in the United States, the Editor having done well to choose from different areas the men who would be most capable of contributing articles of value. We scarcely know to whom the greatest credit should be given for the conception of this monumental work, and the Editor is to be congratulated that he is able to maintain its high quality volume after volume.

DEVELOPMENTAL ANATOMY. A Text-book and Laboratory Manual of Embryology. By Leslie B. Arey, Professor of Anatomy at the Northwestern University Medical School, Chicago. Octavo volume of 433 pages, with 419 illustrations, many in color. Philadelphia and London: W. B. Saunders Company, 1924. Cloth, $5.50 net.

This is a text-book and laboratory manual of embryology in which reference is made primarily to man and mammals. The structural rather than the functional aspects of the genetic history and the development of the parts of the body are emphasized in the text. The volume contains three leading sections: General Development, Organogenesis, and A Laboratory Manual of Embryology.

Professor Arey has given us a book that compares favorably with the best treatises covering a similar ground in the field of genetic and developmental anatomy. The bringing together in one chapter of all the matter pertaining to laboratory technique and observation is commendable and is an improvement over previous editions. The descriptions and discussions are succinct, reflect modern conceptions, and, generally speaking, are adequate. Here and there the space allotted to the description of systems could well be extended with profit. More frequent reference to the literature of embryology would be helpful. For the most part, mooted points are not presented, the author taking definite sides. This is probably a good thing for students. Teachers are, of course, expected to know the literature more extensively. The illustrations are well chosen and are beautifully done. The book is an example of fine press work.

The volume as a whole is a credit both to Professor Arey and W. B. Saunders Company, the publishers. It is especially suited to the needs of medical students and is heartily recommended for this purpose.

W. P. S.

ESSENTIALS OF PRESCRIPTION WRITING. By Cary Eggleston, M.D. Third edition, revised. W. B. Saunders Company, Philadelphia, 1924. Price $1.50.

This is a small pocket manual of less than 150 pages covering the field described in its title, and therefore useful to medical students early in their college years. It does not attempt to give a large number of prescriptions as many compilations do, but only to provide the facts by which the young medical man may learn to write prescriptions which will be correct as to their Latin, as to their pharmacy, and to some extent as to their therapeutics.

MEDICAL CLINICS OF NORTH AMERICA. Volume VIII, No. 2, September, 1924. The W. B. Saunders Company, Philadelphia, 1924. Price $12 in paper, $16 in cloth.

This is the so-called Chicago Number, all the contributors hailing from that city, and there are nineteen of them, dealing as usual with widely diverse subjects, some of which are commonly met with in practice

and some very rarely met with, as, for example, cardiac aneurism on the one hand, and sterility and cardiovascular syphilis on the other.

It will be recalled that the type used in these Clinics is large and heavily leaded, and, therefore, they are most easy to peruse. The present volume is a creditable addition to its predecessors.

A Manual of Diseases of the Nose, Throat and Ear. By E. B. Gleason, M.D. Fifth edition, thoroughly revised. W. B. Saunders Company, Philadelphia, 1924. Price $4.

When a book dealing with a special subject reaches its fifth edition in seventeen years, it becomes evident that it is well put together and that it has proved useful to medical men in general. This edition is somewhat larger than its predecessors, and care has been taken to revise carefully the descriptions which are given of the various operative procedures practiced by rhinologists and laryngologists. So, too, special attention has been paid to the careful revision, and introduction of new matter, as to prescriptions in the latter part of the volume. In this part formulæ are given which the author believes to be useful for various purposes in this department of medicine. We have no doubt that the book will maintain its popularity.

The Surgical Clinics of North America. Issued serially, one number every other month. (Cleveland Clinic Number.) Volume 4, No. 4. Illustrated. Per clinic year (February, 1924, to December, 1924), paper, $12; cloth, $16, net. W. B. Saunders Company, Philadelphia and London, 1924.

This opens with a contribution by Crile on Carcinoma of the Larynx, illumined by a photograph of a robust man aged seventy-two taken 29 years after a complete laryngectomy for carcinoma. Crile advises multiple-stage operations and particularly urges postoperative care. Crile also contributes an article on Hyperthyroidism. Incident to his technique he states he is now able to seize and hold the initiative and to undertake operation on every patient except those who are delirious.

In collaboration with Dinsmore, Crile contributes a paper on Diverticula of the Esophagus.

Bunts gives an excellent discussion on Tumors of the Breast, and Lower instances the rôle of certain mechanical devices in the diagnosis of diseases of the genito-urinary tract. Also in collaboration with Belcher he contributes Notes on Pyelography.

Phillips writes on Subphrenic Abscess and on Thrombosis of the Cavernous Sinuses; Nichols on the application of the *X*-Rays in the Diagnosis of Gall-Bladder Diseases; Portmann on Specialized Hospital for Radiation Therapy. Tucker contributes the report of an unusual case of Banti's disease, with recovery following splenectomy. Waugh reports a foreign body in the esophagus, to-wit, a machine bobbin. Anderson writes on Artificial Pneumothorax in Pulmonary Tuberculosis. He states that pneumotherapy is a tried and approved method, and offers a means of recovery to some patients whose outlook is otherwise hopeless. Jones calls attention to the importance of establishing diagnosis in suspected cases of Vincent's Angina. Kimball describes a functional test in the differential diagnosis of hyperthyroidism. The method consists in giving a small daily dose of iodine, 10 mgms., together with a large daily dose of bromide (50 grs. of sodium bromide). Phillips writes on streptococcus viridans endocarditis, using to combat this condition cacodylate of soda; 10 to 15 grains being given every two or three days for two weeks, the treatment being repeated after an intermission of one week. John contributes an excellent paper on the Diagnosis, Treatment and Prevention of Diabetes. Watkins writes on the Practical Application of Protein Sensitization.

The work closes with a paper on Migraine by Hartsock, and one on Progressive Lipodystrophy Associated with Malabsorption of Fat by Tucker.

This series of papers coming from the Cleveland Clinic summarizes the recent and serviceable advances in the medical and surgical treatment of the affections considered. A brochure deserving unstinted praise.

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